2012

Allegro Bus

Owner's Manual

Tiffin Motorhomes, Inc.

105 2nd Street NW

Red Bay, AL 35582 U.S.A.

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Volume

1

TIFFIN MOTORHOMES, INC.

105 2nd Street NW ✦ Red Bay, Alabama 35582 U.S.A.

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© Tiffin Motorhomes, Inc.
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DISCLAIMER

Many of the features and appliances described in this manual may or may not be reflected in the actual motor home purchased, depending on the options and models selected by the motor-home owner. All items, materials, instructions, and guidance described in this manual are as accurate as possible at the time of printing. However, because of Tiffin Motorhomes' ongoing and dedicated commitment to excellence, improvement of Tiffin's motor homes is a continuing process. Consequently, Tiffin Motorhomes reserves the right to make substitutions and improvements in its makes and models of motor homes without prior notification. Substitutions of comparable or better materials, finishes, appliances, instrumentation, and instruction may be made at any time it is deemed prudent to provide the customer with the best possible motor home meeting the customer's requirements.

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Chapter

1

GENERAL INFORMATION

TIFFIN MOTORHOMES: "WHEREVER YOU GO, WE GO"

Delivery

Throughout the entire manufacturing process your Tiffin motor home has been regularly inspected by our qualified personnel to assure you of the finest product of the highest quality, **without exception**. However, the final inspection at our factory is not to be the last one. The pre-delivery inspection and system check that your dealer performs are the final inspections done to your particular motor home prior to your actually receiving your new Allegro Bus motor home. Your dealer is also available to assist you in understanding the warranties and completing the necessary forms to activate the warranties for the various appliances and accessories installed in your motor home.

Dealer Responsibilities

1. **A pre-delivery inspection and systems check** is performed to assure a thorough inspection of the motor home and to assure the proper operation of all factory-installed components.

2. **A customer walk-through** is performed to familiarize the new customer with the motor home, its systems and components, and their proper and safe operation.

3. Delivery of the **Owner's Information Package** which contains warranty cards and registrations for the vehicle and all factory-installed components from other vendors and suppliers to Tiffin Motorhomes. The detailed operation instructions and maintenance instructions on these components are also included in this package.

4. Assisting the customer in **completing the registration forms** to avoid loss of warranty coverage. The dealer should review the limited-warranty provisions with the customer to stress the importance of completing the warranty cards and registration forms for the components in the motor home to enable the manufacturers to receive them within the prescribed time limits.

5. Providing the customer with **information regarding warranty and non-warranty work** on the vehicle and its separately warranted components.

Customer Responsibilities

The customer is responsible for regular and proper maintenance of the motor home. Properly maintaining your motor home will prevent conditions arising from neglect that are not covered by your Tiffin Motorhomes limited warranty. The maintenance guidelines in this manual and any other, applicable manual(s) should be followed. It is your responsibility and obligation to return the vehicle to an authorized dealer for repairs and service.

To assist you in avoiding problems with your motor home, it is recommended that you do the following:

1. **Read the warranty**. Go over it thoroughly with your dealer to make sure you understand all the terms and conditions of the warranty.

2. **Inspect the motor home**; do not accept delivery until after you have gone through the motor home with the authorized Tiffin Motorhomes dealer. Ask questions about anything unfamiliar to you.

3. **Please ask questions** about anything you don't fully understand about your Allegro Bus; Tiffin Motorhomes is here to serve you and assure that you have all the information necessary for your safe and enjoyable use of your new motor home.

4. When you are taking delivery, **set an appointment for adjustments**. This appointment should be within two weeks after you accept delivery.

5. You are responsible for and expected to **use your Allegro Bus in a responsible, safe manner**. Please take the time to familiarize yourself with the proper operation of the motor home and all its features before you attempt to use your motor home.

Tiffin Motorhomes Limited Warranty

The Tiffin Motorhomes limited warranty was provided to you by your authorized Tiffin Motorhomes dealer during the pre-delivery inspection. When you inquire about your Tiffin Motorhomes warranty, please refer to this document. Should you need or desire an additional copy or other information, please contact**:**

Tiffin Motorhomes, Incorporated

105 2nd Street NW

Red Bay, AL 35582 U.S.A.

Telephone: (256) 356-8661; Facsimile: (256) 356-8219

E-Mail: info@tiffinmotorhomes.com

Tiffin Motorhomes will be pleased to send you an additional copy or any other information requested, as may be warranted.

Major Equipment Manufacturers

The following list is a compilation of the vendors and suppliers of the major subsystems and components of your Allegro Bus. This list is provided for your convenience and is not meant as a complete substitution of the literature and accompanying "how to contact us" information supplied by those vendors and suppliers in your

Owner's Information Package [see below for particulars]. Where appropriate, web-site information is provided for computer users.

- Atwood Mobile Products (800) 646-8557 www.atwoodmobile.com
- LP Gas Water Heater (423) 775-2131 www.rvcomfort.com
- Denso Corporation (248) 350-7500 www.globaldenso.com
- Flexsteel Industries (319) 556-7730 www.flexsteel.com
- HWH Corporation (800) 321-3494 www.hwhcorp.com
- Kwikee (541) 942-3888 www.kwikee.com
- Norcold, Inc. (800) 543-1219 www.norcold.com
- Onan Corporation (612) 574-5944 www.onanindiana.com
- Panasonic Corporation (800) 211-7262 www.panasonic.com
- Power Gear (800) 334-4712 www.powergear.com
- RV Products (Coleman A/C) (316) 832-3400 www.airxcel.com
- Saf-T-Alert (CO/LP Alarm) (800) 383-0269 www.safetalert.com
- Sharp Corporation (800) 237-4277 www.sharp-usa.com
- Suburban Manufacturing Co. (423) 775-2131 www.suburbanmanufacturing.com
- The Dometic Corporation (219) 294-2017 www.dometic.com

For those wishing more information (e.g., locations of authorized subsidiaries), the following web site, **www.rvamerica.com/data/s_alist.htm**, should be helpful. This site provides complete, alphabetic listings of all suppliers and vendors for all contemporary recreational vehicles and motor homes.

Warranty Service

If any warranty service may be required, that service needs to be completed during the warranty period (basic warranty: 12 months or 12,000 miles). Tiffin Motorhomes warrants its unitized construction for 10 years and its laminations for 5 years. Any service work performed after the expiration of the Tiffin Motorhomes warranties WILL NOT be covered by those warranties.

Exceptions may be made, on an individual basis, to this deadline on account of the unavailability of parts and/or service appointment time where work is to be performed. However, don't rely on the possibility of an exception; please schedule any desired in-warranty work before your warranty expires.

Owner's Information Package

The Owner's Information Package (Figure 1-2) includes valuable documents about your Allegro Bus and its components and systems. By consulting the booklets and instruction manuals included in the Owner's Information Package, you will learn how to operate, maintain, and troubleshoot these items safely and effectively. The Tiffin Motorhomes Allegro Bus Owner's Manual does not cover every possible detail of equipment—standard and/or optional—installed on or in your vehicle.

Figure 1-2. Owner's Information Package

As with all valuable documentation, please keep them in a safe, secure place for your later use and consultation. Please complete the warranty registration form and return to Tiffin Motorhomes Inc. within five working days. A stamped copy will be returned to you for your records. Again, please keep this document in a safe, secure place for your later use and consultation.

Customer Relations

If you wish to schedule maintenance or service or wish to order parts, you should notify your local authorized Tiffin Motorhomes Dealership to set up an appointment. If you are unsure of the location of your nearest, authorized Tiffin Motorhomes Dealership; please access the Tiffin Motorhomes website at www.tiffinmotorhomes.com and then click on the "Dealer Locater" button, then enter in the appropriate search criteria such as zip code and search radius or dealer name and state, then click on "Find Locations"—the dealer's name, address, and telephone number will then be displayed for your use.

Specification Labels

There are two main numbers used to identify your Allegro Bus. The Vehicle Identification Number (VIN) is the legal identification of the completed vehicle. The VIN is the number used by the state for vehicle identification and registration. Additionally, there is a Tiffin Motorhomes serial number. The Tiffin number is needed when you plan to make an appointment for service or ordering parts through your Tiffin Motorhomes Dealership or Service Center. This number can be found on the side of the dashboard. A typical sample of this identification label is shown in Figure 1-3.

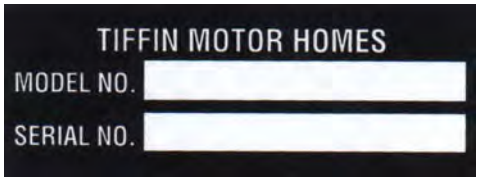

Figure 1-3. Tiffin Serial Number

Another label affixed to your Allegro Bus is the Recreational Vehicle Industrial Association (RVIA) Weight Label (Figure 1-4) which is a required label for your vehicle. Tiffin Motorhomes, a manufacturer-member of

RVIA, has the obligation to disclose the following information, at minimum, to the purchaser of the motor home:

- An indication of the contents of the RVIA weight label affixed to the motor home.

- A concise explanation of the following items:

  - Vehicle Weight (VW) distribution.

  - Proper weighing techniques to be used to weigh the vehicle.

  - Specific definitions for the following terminology:

    - **Gross Vehicle-Weight Rating** (**GVWR**) – This is the maximum permissible weight of the motor home when it is fully loaded.

    - **Unloaded Vehicle Weight** (**UVW**) – This is the weight of the motor home, as built at the factory, with full fuel, engine oil, and coolants. The UVW does not include cargo, fresh water, LP gas, or any dealer-installed accessories.

    - **Cargo-Carrying Capacity** (**CCC**) – This is the maximum weight of all occupants including the driver, personal belongings, food, fresh water, waste water, LP gas, tools, tongue weight of towed vehicle [if any], dealer-installed accessories, and the like. The CCC is equal to or less than the GVWR minus the UVW.

    - **Gross Combination-Weight Rating** (**GCWR**) – This is the value specified by the chassis manufacturer as the maximum allowable loaded weight of the motor home with a towed trailer and/or vehicle [if any].

    - **Sleeping-Capacity Weight Rating** (**SCWR**) – This is the maximum weight capacity of the combined number of persons (i.e., number of people multiplied by 154 pounds per person) permitted to sleep within the vehicle.

    - **Gross Axle-Weight Rating** (**GAWR**) – This is the maximum allowable weight for a single-axle system, as measured at the tire-ground interfaces. The GAWR considers the weakest link in the tire, wheel, brakes, hubs, axle, springs, and attaching parts. To illustrate, if the axle is rated at 15,000 pounds and the tires are rated at 3,200 pounds each as a dual installation; then the maximum GAWR would be 12,800 pounds for a four-tire vehicle

- Towing Guidelines – Specific weighing instructions and guidelines are furnished in the Owner's Manual (see below for a general overview and also in Chapter 2 for more specific details).

Recreational Vehicle Industrial Association (RVIA) Weight Label

Tiffin Motorhomes, Inc.
103 2nd Street NW
Red Bay, AL 35582 U.S.A.
Telephone: (256) 356-8661
Facsimile: (256) 356-8219
E-Mail: info@tiffinmotorhomes.com

Motor Home Weight Information

Model Name: 400H-Freightliner	Serial Number: 2405	Year: 2002

Weight Terminology and Definitions

GVWR	**G**ross **V**ehicle **W**eight **R**ating is the maximum permissible weight of this fully-loaded motorhome.
UVW	**U**nloaded **V**ehicle **W**eight is the weight of this motorhome, as manufactured at the factory, with full fuel, engine oil, and coolants.
SCWR	**S**leeping **C**apacity **W**eight **R**ating is the manufacturer's designated number of sleeping positions multiplied by 154 pounds [70 kilograms].
CCC	**C**argo **C**arrying **C**apacity is equal to GVWR minus each of the following: UVW, full fresh (potable) water weight (including water heater), full LP-Gas weight, and SCWR.
GCWR	**G**ross **C**ombination **W**eight **R**ating means the maximum allowable loaded weight of this motorhome and any towed trailer or towed vehicle.

Cargo Carrying Capacity (CCC) Computation – Example

Item	Description	Weight (Lbs.)	Weight (Kg.)
GVWR	Gross Vehicle Weight Rating	14,050	6,386
Minus UVW	- Unloaded Vehicle Weight	-9,250	-4,204
Minus Fresh Water weight	- Fresh water weight of 106 gallons @ 8.3 lbs/gallon [3.8 Kg./gallon]	-880	-376
Minus LP Gas	- 80 gallons @ 4.2 lbs/gallon	-336	-149
Minus SCWR	- 6 persons @ 154 lbs/person	-924	-420
CCC* this motorhome	*(Note: Dealer-installed equipment and towed-vehicle tongue weight will reduce CCC).	**2,660**	**1,237**

WARNING: Consult Owners Manual(s) for specific weighing instructions and towing guidelines including auxiliary brake requirements for any towed trailer or towed vehicle.

Revision Date: 24 June 2002

Figure 1-4. RVIA Weight Label

Weighing Procedures for the Allegro Bus

To weigh the motor home properly, the motor home should be level when the weighing process is performed. Your Allegro Bus motor home has been designed and built in compliance with the recommended limits of the major-component/system suppliers to provide a realistic CCC. However, it is up to the final user to provide even distribution of the loads brought into the motor home to prevent uneven loading. Once the motor home is loaded, it can be taken to any drive-on scales or individual-wheel scales to determine that the final weight is within specified limits for the motor home. The procedure which can be used is as follows:

First, drive the motor home onto the scales so that all wheels are on the scales; this provides the gross vehicle weight (GVW) of the motor home and can be recorded as such. The GVW should not exceed the GVWR specified for the motor home. Second, drive the motor home so that the front wheels are off the scales and only the rear wheels remain on the scales; this provides the total weight of the motor home, save for the front axle. This weight should not exceed the total rating of the axles remaining on the scales. The front axle weight is determined by subtracting the weight from the GVW that was obtained in the first step which was performed earlier. The result should not exceed the listed front-axle weight rating. For a more thorough weighing of the motor home, Chapter 14 contains more specific axle-weight determinations.

Weight Distribution throughout the Motor Home

To assure the maximum stability of the motor home under static (i.e., parked) and dynamic (i.e., moving) conditions, the distribution of the items to be carried and stored within the motor home and in the storage bays underneath the motor home should be performed in such a manner to strive for reasonably even side-to-side and front-to-rear dispersion of the entire weight of both the stored items and also the driver and expected passenger(s) during transit. This process will assure that the motor home is not "lop-sided" in weight distribution (i.e., all the stored weight on one side and/or mainly towards the front or the rear)—keeping a center of mass of the motor home essentially centered on a front-to-rear and side-to-side basis will also provide better control of the motor home when it is in motion.

Chapter

2

Driving & Safety Instructions

Safety Considerations

Prior to using your motor home, especially for the first time or after a long period of non-use, please read thoroughly all the instructions in both the Owner's Manual and the chassis-manufacturer's manual before attempting to operate your motor home. There are several safety considerations which you should realize and follow while your Allegro Bus is in motion. These safety considerations, as well as others meant to preclude any damage to the motor home, are listed in this chapter. Besides the driver, it would be helpful for the passengers to be familiar with these safety considerations and precautions, too.

Warning

Before your motor home is to be operated, be sure that you have read the entire Owner's Manual and that you fully understand the equipment on your motor home and how to use that equipment safely.

General Warning

Warning

Any portable, fuel-burning (e.g., charcoal, propane, butane, wood) equipment must not be used inside the motor home. Any use of such equipment inside the motor home may readily cause fires and/or asphyxiation by carbon-monoxide poisoning. Further, such unauthorized use would probably invalidate your motor-home insurance policy.

In general, there are several "common-sense" safety precautions that should be taken every time the motor home is to be used on the road; these precautions include:

- Only seats with seat belts should be used while the motor home is in motion; those seat belts should be worn by all people (driver, passengers) in the motor home at that time.
- While the motor home is moving, lock all seats in the forward-facing position to provide maximum safety for the users.
- While the motor home is moving, no one inside should ever stand or kneel on seats (e.g., young children).

- In the majority of states, it is the law that seat belts must be used (fastened snugly about the chest and hip areas), anytime the motor home is in motion, to provide desired protection in the event of a crash.

- Any fire extinguisher(s) should be inspected on a monthly basis to assure that each extinguisher is properly charged and ready for operation.

- Any smoke and/or carbon-monoxide (CO)/liquid propane (LP) gas alarm(s) should be regularly inspected and tested. If being used for the first time, the smoke and/or CO alarm should be properly activated and fresh batteries installed before the motor home is placed into service. Prior to any trip, the smoke and/or CO/LP gas alarm(s) should be manually tested to assure their correct operation. Immediately replace any defective components (e.g., weak batteries). Never sleep in a motor home not having functional smoke and/or CO/LP gas alarm(s). Should an alarm or detector fail when in transit, a suitable replacement can be purchased at most hardware stores, superstores, or drug stores.

- While the motor home is moving, the sleeping facilities are not to be used.

- In the event of an emergency, be sure that everyone in the motor home is familiar with all escape exits (doors, escape window). Do not use the emergency window as a routine exit; this is strictly to be used for emergency purposes only. When the motor home is parked, be sure that the emergency exits are not inadvertently blocked.

Prior to Departure

For your continued safety and convenience, the following is a representative "check list" designed to assure your safety while driving:

- Clean all windows, mirrors, and light lenses (front, back, side) to assure that you can "see" and "be seen." Reposition any mirrors or other fixtures to provide an unobstructed view (front, sides, and back) from the driver's seat (see Chapter 9 for details). When another driver takes over, reposition the mirrors and other fixtures for that driver.

- Remove or secure all loose exterior fixtures (e.g., awnings, flags, antennas, portable lights) to keep them from falling from the motor home when the motor home is in motion.

- Make a "walk-around" visual inspection of the motor home to note any irregularities (e.g., loose trim) or problems (e.g., under/over inflated tires; abrasions or nicks on the tires); correct noted problems accordingly.

- Check all exterior storage-compartment and generator-compartment doors to make sure that they are properly latched and locked. If need be, check inside all exterior compartments to make sure that all cargo and equipment are properly secured so that they won't work loose and become hazards during sudden starts and stops.

- Check tires for proper inflation (i.e., cold inflation pressure: 100 psig or so); if the motor home has not been used, make sure that the "cold inflation" pressure is maintained. If the motor home has very recently been used, make sure that the "hot inflation" pressure (see the tire-manufacturer's literature to determine appropriate "hot inflation" pressure) is maintained. All tire pressures should be within 1-2 pounds (psig) of each other, unless weight loading dictates otherwise (see Chapter 14, Section 14-23).

- Examine wheel lug nuts to assure their proper tightness. If any lug nuts were found to be loose, first check the fit of the wheel to the hub to make sure that the wheel is not mis-mounted which would produce a "wobbly" wheel when the motor home is in motion, then tighten the lug nuts.

- Check all fluid levels (e.g., engine oil, transmission fluid, coolant, power-steering fluid, brake fluid, battery fluid [if applicable], windshield-washer solvent) to assure correct levels are maintained. Fill any low reservoirs, as needed.

- DO NOT SUBSTITUTE any other fluids for specified oils, transmission fluid, brake fluid, or other hydraulic fluids—in most instances, substitutions are not acceptable and may void warranties.

- Prior to starting the motor-home engine, make sure that all lines (e.g., water, sewer) and electrical-power cords are disconnected and properly stowed.

- Assure that the leveling jacks are in the "travel" position.

- After entering the motor home, make sure that the electrically-actuated, retractable step has properly operated to retract the step fully before starting the engine of the motor home.

Driving

Various adjustments need to be made to assure the driver's comfort and the safety of the motor home before starting and moving the motor home; these include:

Figure 2-1. Driver's Instrumentation Panel

- The driver should adjust the driver's seat, the tilt steering, the exterior rear-view mirrors, and the instrumentation panel (Figure 2-1) lighting (if night-time) for the driver's comfort and safety. This is especially important for first-time use so that the driver may become accustomed to the "feel" of the motor home and know where the various adjustments are located "before the fact"; not after some need arises while the motor home is in service.

- The driver should be familiar with all gauges, instruments, switches, and indicators on the instrument panel (Figure 2-1) prior to driving. Should the driver encounter any "unknowns" on the

panel, they should be investigated (via the Owner's Manual or Owner's Information Package) prior to departure so that the driver fully understands these items and their functions.

- One should never adopt a "learn as you go" philosophy, as there are too many controls and switches to be understood before the motor home is actually used. Please take the time to become thoroughly familiar with the entire instrument panel prior to using the motor home on the road.

- Do not operate the cruise-control function during any extreme weather situations (e.g., snow, ice, sleet, heavy rain) or when road conditions are hazardous (icy, snowy, winding roads, city traffic) or when a constant speed of the motor home is not possible or if traffic conditions don't warrant such.

- Avoid driving the motor home through any standing water. If deep enough, such water can wet the brake pads and cause fading of the brakes (i.e., loss of braking power) and lead to excessive sliding or pulling to one side or another.

- If one has driven through standing water, at the first opportunity safely to do so, check the braking action. If braking has degraded, lightly apply the brakes to allow the brake pads to dry—don't use the motor home when the braking function is significantly reduced.

- Know the limits of operation of the motor home. Don't try to achieve excessive speeds, climb overly steep hills, traverse overly long grades, attempt to use the motor home as an "off-the-road" (OTR) motor home, rapidly switch lanes, or rapidly accelerate or decelerate the motor home. When in doubt about the handling characteristics of the motor home, consult your chassis manual for information.

- The solar or blackout shade is operated by a switch located on the driver's console. Depress the switch to lower or raise shade. The switch will be labeled "VISOR." The time delay switch must be held a few seconds before it is activated. **CAUTION:** DO NOT over extend the shade as this may block the view of the road.

Fuels for the Motor home

Your motor home is designed to use low sulfur fuel only for the engine used in the routine operation of the motor home—these require prudent and safe handling to assure safety of the motor home and its occupants; namely:

Figure 2-2. Fuel Tank Fill Door

- Anytime the motor fuel (i.e., diesel fuel, see Figure 2-2) or the LP tank (see Figure 2-2) is to be filled, the motor home engine is to be turned "off," all pilot lights must be extinguished, and appliances turned "off."

- Further, during any filling operation or connecting/disconnecting of any LP tanks, a NO SMOKING policy should always be observed. In a similar manner, any other comparable devices of the motor-home users (e.g., butane camp-lights, propane lights and grills) should be treated in a similar manner to assure the safety of all concerned.

Warning

Liquid propane (LP) gas containers, gasoline, or other flammable liquids are not to be placed or stored inside the motor home because a fire or explosion may occur. LP gas containers are equipped with safety valves that may relieve excess pressure by discharging gas into the atmosphere—any containment of that vented LP gas constitutes an explosive hazard.

Figure 2-3. Liquid Propane Tank

- NEVER use an open flame to test for LP gas leaks or to examine the fluid levels in the fuel tanks.
- After filling any LP system, immediately replace and secure all protective covers and caps.
- After closing the LP valve, close and securely latch the LP door to prevent unintentional access or damage.
- NEVER connect natural gas to the LP gas system—LP gas and natural gas are not interchangeable.
- NEVER use any other "burning" equipment (e.g., charcoal grills, wood stoves, butane lights, propane lights) inside the motor home—doing so may cause fires and/or asphyxiation.

Liquid Propane (LP) Gas System

A warning label is conspicuously located near the LP gas container (Figure 2-4); that label reads:

Warning

DO NOT FILL the LP Container(s) to more than 80% of capacity.

Any overfilling of the LP gas container(s) can result in uncontrolled gas flow—a prime condition for a fire or explosion. The LP container should only be filled to 80% of its capacity; the remainder of the cylinder space is vapor space to contain expansion of that liquid when subjected to varying ambient-temperature conditions. Filling in excess of 80% of the liquid volume of the container reduces that vapor space and, thus, creates a condition for possible over-pressurization of the container.

Figure 2-4. Liquid Propane Tank

All LP appliances in your motor home have been approved for use in motor homes by a nationally recognized testing laboratory (i.e., UL and CSA certified). When properly used, LP gas is a clean-burning fuel which can be dependably used.

In actuality, the LP container contains liquid propane under high pressure. The liquid, when it passes through the tank valve to a lower pressure, vaporizes into a gas, and then passes through a regulator to maintain a constant pressure. This gas, then, is the actual fuel distributed through the LP-gas manifold system to the LP-based appliances used in your motor home.

LP-appliance-lighting problems are typically caused by an improperly adjusted gas regulator. NEVER attempt to adjust or reset the gas regulator yourself, as an authorized service technician is needed to make these adjustments. As a good preventive-maintenance activity, the regulator should be checked semi-annually by a service technician and also before every extended trip.

Even though the LP-gas system is leak-checked and verified at the factory at the time of manufacture, normal usage (travel vibrations, etc.) could loosen the fittings. Consequently, it is wise to check the gas fittings periodically for leak tightness. One can daub some leak-detector solution (e.g., a "liquid-soap"-like solution) on all the fittings, connections, and junctures when the system is under pressure. Should there be any leaks, small bubbles will appear at any leak sites.

Generally, loose fittings can be tightened (with "non-sparking" tools) to stop the leaks. If this process doesn't work, then one must shut off the main gas valve at the LP cylinder(s) and immediately consult an authorized service technician to determine what repairs are necessary. Leaks may also be detected by noting the sulfurous odor (i.e., rotten eggs) associated with LP gas [caused by an additive added to the normally odorless LP gas]. DO NOT search for a leak by using a match or open flame.

Warning

When the motor home is not in use, be sure to close the main LP gas valve at the tank. When the LP gas tank is to be refilled, close the main valve to preclude the chance of the pilot lights possibly igniting fumes from the LP fuel. As some LP-gas appliances (e.g., refrigerator, furnace, water heater) have Direct Spark Ignition (DSI) systems, it is very important that these appliances be turned "off" when the LP gas is "off." The DSI boards will continue to work (i.e., generate an ignition spark) even when there is no LP gas available.

LP Gas Regulator

The LP gas regulator (Figure 2-4, center of picture) is the most critical element of the LP-gas distribution system. The regulator converts the high-pressure LP gas from the tank into a reduced-pressure LP-gas supply suitable for use in the various appliances in the motor home. One should regularly inspect visually the regulator system.

If any damage or corrosion is noted, contact an authorized service technician to inspect and repair or replace the regulator. Do not attempt to adjust the regulator yourself; the regulator has been pre-set at the factory. Only a qualified LP service technician using specialized equipment should adjust the regulator.

LP Distribution System

The primary LP distribution system in the motor home is a black, steel pipe manifold running the length of the motor home. The secondary distribution lines running from this main distribution system are usually copper tubing with flare fittings. If any of the gas lines break, do not attempt to splice them—always run new lines to maintain the safety of the motor home. It is strongly recommended that only qualified service technicians perform this work.

Remember, the main valve at the LP gas tank must be closed whenever any gas appliance is to be installed, removed, or serviced—this process prevents LP gas leakage which could result in a possible harmful explosion. If the odor of LP gas (e.g., rotten eggs) is ever detected, immediately discontinue use of any gas appliances and seek the services of a qualified service technician.

Recommended Precautionary Practices

The following practices are recommended to assure continued safety and reliability of the LP gas system; these are, of course, representative; not necessarily exhaustive. In all cases, use common sense in the use of the LP system.

- Visually inspect the LP fill valve before any refueling operation to look for foreign materials or debris; remove, as necessary, to assure a leak-tight connection.
- Prior to any re-fueling operation of the LP gas system, shut off all the pilot lights.
- NEVER, under any circumstances, check for LP gas leaks with any type of open flame; doing so would probably cause an explosion and subsequent fire.
- Periodically inspect visually the entire LP gas distribution system; do so at least semi-annually and before any major trips. Should problems be noted, seek the services of a qualified service technician to make necessary repairs and perform any maintenance.

Warning

The LP gas distribution system in your motor home is designed for liquid propane (LP) gas ONLY. DO NOT attempt to connect and use any natural-gas or butane-gas systems with this LP gas system.

Fire Safety

As with any enclosed system containing the three required conditions for fire (i.e., combustible materials, oxygen, ignition sources), there will exist the possibility of fire. Tiffin Motorhomes has taken every precaution and design practice to minimize or negate this possibility, but the final determination rests with the owner and user of the motor home. Accordingly, it is in the best interests of the owners, users, and their guests to be aware of basic fire-safety practices and procedures and those particular features that Tiffin Motorhomes has provided for fire safety.

Fire Extinguisher

The Allegro Bus is equipped with a fire extinguisher (located on the passenger's console, see Figure 2-5) rated for both Class B (i.e., grease, gasoline, diesel fuel, flammable liquids) and Class C (i.e., electrical) services—these are typically the most likely types of fires to be expected in motor homes. Read and understand the accompanying owner's manual on that extinguisher (found in your Owner's Information Package) and remember the location of the extinguisher. In an emergency, you won't have the time or presence of mind to do so then. You may wish to purchase other extinguisher(s) [e.g., for the rear interior, around the generator outside; etc.] at your discretion.

Figure 2-5. Fire Extinguisher

These types of fire extinguishers are pressurized, mechanical devices and require that appropriate care be used in their safe storage and use. The owner's manual will provide necessary guidance for the proper storage, handling, and use of the extinguishers. Prudent preventive maintenance suggests monthly inspection of any fire extinguisher to assure that it is sufficiently pressurized (i.e., the needle on the gauge is in the "normal" zone) and that the mechanical components are not blocked in any way.

Do not test a fire extinguisher by partially discharging the unit—this will cause a loss of pressure and may lodge some fire-retardant materials in the valve mechanism and cause the extinguisher to continue to vent slowly down to zero pressure. Rather, if an extinguisher is ever partially used; continue its use until the unit is completely discharged then have the fire extinguisher fully recharged at an appropriate service center (one can call any fire department for information on having an extinguisher recharged in that particular locality). DO NOT wait a long time to recharge an empty fire extinguisher; you'll never know when it may be needed.

Should a fire occur inside or around the motor home, ***evacuate the motor home quickly and calmly***—do not panic. In the event of heavy smoke or extensive flames, keep low (crawl if you must) and make your way to the nearest exit (door, emergency window) and leave. If the fire involves a fuel source (e.g., motor fuel, LP gas); consider the probability of an explosion and move sufficiently far away to minimize personal harm. If such is available, immediately place a call to the local fire department (or ask someone nearby to do so) to report the fire. Consider the cause and the consequences of the fire and the risks associated with possibly fighting the fire yourself before trying to extinguish it—DO NOT expose yourself or others to unnecessary danger.

Smoke Detector

The Allegro Bus motor home is equipped with a battery-operated smoke detector (Figure 2-6) located on the ceiling in the living area of the motor home (left-hand side of picture). Read and become familiar with the operation and periodic testing of this detector. The smoke detector should be tested on a weekly basis, before each trip, and after any period of storage of the motor home. If a low-battery condition is noted or the alarm "chirps" to indicate a low-battery condition, immediately replace the battery.

Figure 2-6. Smoke Detector (Left)

It would be prudent to keep replacement batteries in the motor home for any in-transit replacements so that the smoke-alarm capability is never compromised. DO NOT disable the smoke detector for any transient, false alarm (e.g., cooking smoke, dusty furnace, tobacco smoke); rather, ventilate the motor home with fresh air and the alarm will reset.

Emergency Exit Window

In the rear of the motor home, there is an emergency exit window (Figure 2-7) in the bedroom—this window is designed for an emergency exit when it is not practical to exit by the door [also an emergency exit] in the front of the motor home. This window is readily noticeable by its red handle and the red "EXIT" label on that window.

Figure 2-7. Emergency Exit Window

To use this window as an emergency exit, lift the handle and push outward on the window. As required, the window can be closed by pulling the window inwards and then lowering the handle to latch the window back in place. When the motor home is to be parked, it would be wise to note where this window will be so that this exit won't be blocked (e.g., against a tree, pole, or wall).

Parking Procedures

To park the motor home in any unfamiliar terrain, examine the prospective site for surface irregularities, slopes or inclines, and other discontinuities (i.e., stumps, rocks, external connections for power/water/sewage) and also examine the area immediately above the proposed parking site for obstructions (e.g., tree branches and limbs, signs, overhead wiring).

If the motor home is to be backed into the proposed parking site, strive to have that site be on the driver's left-hand side, as this will allow the driver to watch the rear of the motor home. Back up slowly and use the side mirrors and the back-up camera as a guide or, better yet, have another person outside provide supplemental guidance to help park the motor home.

When the motor home is finally situated, shift the transmission into neutral, set the air brakes, and then turn "off" the engine. Activate the leveling-jack system (see Chapter 9 for more detail) to level and stabilize the motor home.

If the motor home is to be powered externally, connect the 120 VAC power to the motor home. Turn "on" the LP gas valve at the LP tank. Connect the fresh-water supply and sanitize the water systems (see Chapter 11), as needed. Connect the waste drain hose to the external sewer hook-up. Start the refrigerator, water heater, and furnace; as warranted. Light the oven pilot light, as needed. Certain appliances, such as the refrigerator, will not work properly if the motor home is not level, so be sure to complete the motor home-leveling process before activating any of the appliances.

Towing Hitch

The Allegro Bus is fully capable of towing typical motor vehicles; the motor home is equipped with a Class 3, 10,000-pound towing hitch (Figure 2-8) and associated wiring connector. The motor home is capable of towing light loads and instructions for such are found in the chassis-manufacturer's literature in the Owner's Information Package provided with the Allegro Bus.

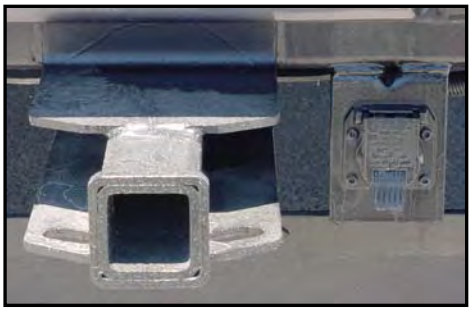

Figure 2-8. Class 3 Towing Hitch

As a towed vehicle being pulled by a motor home represents a greater complexity in driving for the driver (e.g., turning, backing, parking), one should not attempt such on the road without first practicing such (e.g., in a vacant lot) to master these skills.

The total weight of the motor home and any vehicle towed by that motor home must not exceed the Gross Combined Weight Rating (GCWR). When the motor home is being weighed, remember to account for passengers and their locations in the motor home. **Any vehicles to be towed by the motor home should have adequate active braking**.

The wiring connector provided is a standard seven-pin connector, a more detailed description of which is provided in Chapter 7. If needed, the connector for the trailer brake actuator is normally located beneath the access panel located on the dashboard pod. However, your Bus may not have an access panel. The connector is usually to the left of the steering column under the dash.

Chapter

3

Heating & Air Conditioning

Furnace

Warning

Never attempt to modify the furnace. To do so may cause fire, explosion, carbon-monoxide poisoning, and/or asphyxiation. If the furnace is malfunctioning, immediately shut the unit "off" and call a trained service technician to make necessary repairs as soon as possible.

The Allegro Bus motor home is equipped with a forced-air furnace fueled by LP gas. The furnace is controlled by the wall-mounted thermostat (Figure 3-1) located inside the motor home—this thermostat controls both the heating and air conditioning for the motor home.

In the heating mode, the furnace heats air which, in turn, is circulated through ductwork in the floor of the motor home. If any obstruction(s) block the floor vent(s) or air-return register, then the furnace will not function properly. Therefore, any items stored under the cabinets should be carefully stowed to prevent damaging or crushing the furnace ducting or blocking the warm-air return.

Figure 3-1. Thermostat

When a furnace is being used for the first time, there may be an initial "burn-off" of manufacturing compounds or residues left on the heat exchanger or in the ductwork which could produce odors, fumes, and possibly some smoke. This occurrence is normal and should not cause concern, unless it persists for an excessive amount of time.

To minimize the after-effects of this "burn-off" process, the initial use of the furnace should be done with all the doors and windows open to permit normal air circulation to dissipate these possible odors and fumes.

For routine operation of the furnace, set the thermostat to the desired temperature setting and then turn "on" the thermostat; in about a minute, the furnace should begin to operate and warm or hot air should be coming through the ductwork.

To shut down the furnace, turn the thermostat to the "off" position. Even though the thermostat may be turned "off," the furnace system will continue to run for about a minute or so to permit a gradual cool-down of the heating system which is normal.

On a regular basis, thoroughly clean the complete furnace and air-tube passageways to remove dust, lint, and any other possible obstructions. Leak-test the entire LP gas system at least semi-annually. Also check and clean the air-blower system annually.

Any access hatches to the furnace are for authorized service personnel only, as there are no user-serviceable parts on the furnace. Accordingly, do not attempt to tamper with the interior of the furnace.

Warning

Be cautious when washing the exterior of the motor home; water should never be sprayed directly into the furnace vent. Should any water be forced beyond the rain baffles into the furnace vent, the furnace may rust which, in turn, may cause improper combustion and produce unwanted by-products of combustion.

Before the beginning of each travel season, the furnace should be thoroughly cleaned and inspected. Any obstructions, debris, or lint which may obstruct free air flow or impede the operation of the air-circulation system should be removed. For example, accumulated dust or lint could possibly obstruct the orifices for the pilot light or may accumulate on the blower blades and unbalance the operation of the blower. Additionally, any debris in the ductwork, when heated by the furnace, could emit unpleasant odors or possibly become a fire hazard.

Consequently, the furnace system should be periodically cleaned; annually is recommended unless the motor home is subjected to dust levels significantly greater than average; in which case more frequent cleaning is recommended. The Owner's Information Package provides recommended cleaning tips and procedures; when needed, a more thorough cleaning should be performed by a qualified service technician.

Hydro-Hot Heating System *(Optional)*

Depending on what model your Allegro Bus is, it may feature a Hydro-Hot heating system (Figure 3-2) that provides a continuous, on-demand supply of domestic hot water, as well as interior zone heating where and when it is needed. Both heating features are accomplished by a unique VDC-Powered Diesel-Fired Burner and a VAC-Powered Electric Heating Element (120 VAC). These two heating sources maintain the temperature of the Hydro-Hot's solution of water and antifreeze.

Figure 3-2. Hydraunic Heating System

To activate the optional Hydro-Hot heating system, the hydro-hot switch (labeled "diesel burner switch") located in the side cabinet above the driver's seat must be activated. By activating this switch, a supply of hot water as well as interior heat can be provided. The heating feature will be controlled by the thermostat mounted on the wall. It is operated off the furnace function of the thermostat to provide interior heat.

If interior heat and hot water are demanded from the Hydro-Hot system at the same time, hot water will simultaneously take precedence over interior heat; therefore causing the interior heat to shut down and turn off until the water flow is turned off from water sources.

The surge tank (Figure 3-3), located in the basement, should be routinely inspected to make sure the antifreeze fill line stays in the acceptable zone. If the antifreeze becomes low, you must add the recommended antifreeze stated in the Hydro-Hot's owner's manual. If antifreeze is totally depleted from the surge tank, a switch will be released inside the main Hydo-Hot tank disabling the system from operating. Antifreeze will then have to be added to the tank to reactivate the switch and allow the system to operate.

Figure 3-3. Surge Tank

Figure 3-4. Control Panel

If batteries accidentally become discharged and the Hydro-Hot system is activated, the system will automatically shut down before batteries are totally discharged. Once power is restored to batteries, the system must be reset by depressing the reset button on the black panel of the surge tank (Figure 3-3).

For detailed instructions on operating the Hydro-Hot Heating system, refer to the specific owner's manual found in the Owner's Information Package.

Caution

Your Hydro-Hot heating system operates off the coach's sole diesel tank! Keep in mind that the Hydro-Hot fuel tube is located higher up in the diesel tank than the coach's engine fuel in order to prevent complete depletion of the diesel fuel tank. Be sure an adequate amount of fuel is in the fuel tank before dry camping.

Caution

DO NOT operate the Diesel-Burner and/or the Electric Heating Element without the water and antifreeze solution in the Hydro-Hot's Boiler Tank. Failure to do so will cause serious damage to the Heater.

Caution

Yearly maintenance is required on the burner portion of the Hydro-Hot heating system.

Air Conditioning System

The factory-installed air-conditioning system is designed for 120 VAC power supplied either from the external power hookup cord or from the generator. Any unnecessary interior heat loading (e.g., exposure to direct sunlight for long periods of time; transmittance of sunlight through the windows) will work the air conditioning system harder and may compromise the desired results. Accordingly, if the air conditioning system is to be used, park the motor home in a shady location whenever possible and close drapes on those windows exposed to direct sunlight. Additionally, any heat-producing sources (e.g., oven, unnecessary lights) within the motor home will work against the air conditioning system; so strive to minimize their use.

The air conditioning system is the major consumption device of electrical power in the motor home. When this system is being used in an RV park, cumulative use of these air-conditioning systems by the resident motor homes can create, at times, a bigger demand for electrical power than is actually available. Accordingly, at such times a "brown-out" condition may arise—this is when the AC voltage normally available drops to a lesser value (e.g., 10-20% below normal or more).

"Brown-out" conditions cause appliances to draw greater currents to make up for the reduced voltage; thereby causing circuit breakers to trip or fuses to blow. Under such conditions, your own motor home is not at fault; simply reset your breakers and/or replace your fuses. Should such conditions continue, one may wish to turn reduce the electrical load (in this case, turn "off" the air conditioning system for awhile) or start the electrical generator.

To cool the motor home, the thermostat inside the Allegro Bus is used—this is the same thermostat which controls the furnace functions (described earlier). The air-conditioned, cooled air is emitted through the vents which are located in the roof throughout the entire coach. The discharge and return air vents run parallel, front to back, on the ceiling. Note that the return vents are similar to the air conditioning vents. This system allows even distribution for the returns instead of forcing an excess amount of return air through two smaller openings. The even return system takes more of the hot air from the motor home, thereby providing cooler air throughout the unit. The air conditioning vents that are mounted on the ceiling are round vent filters (Figure 3-5) that need to be periodically checked for dust accumulation. When dust has accumulated on the filters, remove them and wash in a mild detergent and warm water.

Figure 3-5. Round Vent/Filter

Thermostatic Controls

The following is a brief overview of how best to use the thermostat (Figure 3-6). For more detailed instructions, please consult the thermostat literature in the Owner's Information Package.

1. Move power switch to ON.
2. Depress the MODE button to select function. (COOL*, FURNACE,

Figure 3-6. Thermostat

FAN ONLY, etc.)

3. Depress the FAN button to select fan speed or automatic operation.
4. Depress the UP or DOWN button to set your desired temperature for the zone.
5. If your vehicle contains more than one ZONE, depress the ZONE button to select Zone 2, and repeat procedures from Step 2 above. Repeat procedure for each additional zone.
6. If your vehicle has two roof top air conditioners utilizing a 50 amp power cord, some restrictions may apply. When only 30 amps are available, you most likely will have to turn off one of the two air conditioners to prevent tripping the circuit breaker. Refer to Step 5, then Step 2, for shutting off the air conditioner in your selected zone.

NOTE: There is an approximate 2-minute time delay after selecting cooling function for refrigerant compressor to start.

NOTE: If the Comfort Control is turned "off" or the thermostat loses power (i.e., power failure), the air-conditioning system will resume operation at the last settings programmed into it when electrical power is restored.

Liquid Propane (LP) Tank

The Allegro Bus is equipped with an ASME (American Society of Mechanical Engineers)-approved LP tank (Figure 3-7) which is equipped with an automatic pressure regulator. This tank contains liquid propane fuel under high pressure. As this fuel passes through the main valve and through the regulator, it is converted into a gas and its pressure is reduced to a safe level for use within the motor home. A LP gas-distribution system distributes the gas to those appliances using such in the motor home. The "heart" of this LP gas distribution system is the regulator and that regulator should only be adjusted by a qualified service technician. Most of the problems encountered in lighting the pilots of these appliances are caused by regulator misadjustments.

Figure 3-7 Liquid Propane Tank

The major component of the LP gas supply is a manifold pipe which runs lengthwise underneath the motor home floor. From this manifold, the various gas appliances are connected by copper tubing with flared fittings so that connections and disconnections can readily be made, as needed.

Should any of the secondary tubing develop a leak, either on the tubing proper or at the fittings, do not attempt to splice any of these lines. Instead, have a qualified service technician run a new length of tubing to the appliance of concern and then have that line leak-tested before placing it in normal operation.

To remove, repair, or replace any gas-operated appliance; always close the main gas valve at the LP tank—this measure will provide an additional element of safety to prevent gas leakage and possible, subsequent explosion hazards. However, if a gas leak is noted or suspected, turn "off" the main valve and keep the LP gas system "off" until that system is inspected by a qualified service technician as soon as possible.

Do not delay in addressing any possible gas leaks with appropriate service because of the inherent hazards to safety.

Warning

When the motor home is not being used, the main LP gas valve must be turned "off." Also, turn "off" the main valve when the LP gas tank is to be refueled to avoid the possibility of ignition fuel fumes by the pilot lights. All gas valves on the gas-operated appliances with Direct Spark Ignition (DSI) should also be in the "off" position during refueling and/or maintenance operations. DO NOT store LP, motor fuel, propane, butane, or other flammable liquids inside the motor home as these represent a very real fire hazard and possible threat to life.

LP Tank Filling Practices

Any LP gas tank associated with the motor home should never be filled to more than 80% of total capacity; filling should always be done only when the motor home is leveled. If the motor home is not level, the tank may be overfilled (i.e., more than 80% of capacity) and, thus, subject the motor home to possible fire or explosion from resultant uncontrolled gas flows.

LP Gas Regulator

As noted earlier, the LP gas regulator (Figure 3-8) is the "heart" of the LP gas distribution system. This regulator reduces and controls the pressure of the gas on the outlet end to provide a constant supply of gas at a constant pressure to the gas-operated appliances.

Figure 3-8. LP Gas Regulator

The regulator has a vent to relieve excess pressure on the inlet side of the regulator, should excess pressure develop in the gas tank and connecting gas line to that regulator inlet. The vent would normally release the excess LP gas to the atmosphere until the over-pressurization condition is eliminated.

This vent should be regularly checked to assure that it is not clogged or obstructed. If that vent is blocked from normal operation, component or system failures may result. If periodic visual inspection indicates any sign of corrosion or degradation, contact a qualified service technician to repair the regulator as soon as possible; DO NOT operate the LP gas system with any faulty component in place.

Occasionally, the inherent moisture in the LP gas can cause a freeze-up of the regulator when the gas passes through the regulator. The regulator reduces the high pressure of the gas on its inlet side to a reduced pressure on its outlet side by permitting a controlled expansion of the gas through the regulator—this gas expansion necessarily cools the gas (by means of the Joule-Thompson effect) and, if cooled enough, may cause any moisture content to freeze.

To minimize or negate this possibility, always keep the main valve to the LP gas tank closed when the system is not in use. When the LP tank is empty, keep the main valve closed until re-filling is to be performed—this process will keep any moisture-laden air from back-flowing into the gas system and trapping unwanted moisture in the LP gas tank.

If an empty LP gas tank has been exposed to the atmosphere for an extended time, let a qualified service technician purge the tank before its next filling operation.

Important

When a LP gas regulator is installed or re-installed, the regulator must always be installed with the gas diaphragm vent facing downwards. For more information, consult the manufacturer's literature in your Owner's Information Package that came with the motor home.

CO/LP Gas Detector

Warning

Liquid propane (LP) is extremely flammable and, when contained, explosive when mixed with air. Consequently, never check for leaks in LP gas lines or appliances with an open flame or sparking devices. Do not use any ammoniated or chlorinated household-type detergents for "bubble testing" possible leak sites—these detergents may generate fissures or cracks on the metal tubing (e.g., copper) and flared fittings (e.g., brass). Have your LP gas system leaks repaired ONLY by a qualified service technician; do not attempt these yourself. Keep the main valve to the LP gas tank closed and all appliances turned "off" when the motor home is stored. If any of the valves do not close "leak-tight" by hand, have those valves examined and repaired by a qualified service technician. DO NOT, under any circumstances, attempt to use a faulty LP gas system and/or appliances as such may represent a safety hazard.

Since LP (i.e., liquid propane) gas is more dense than air, the LP gas will naturally settle to the lowest point in an enclosed space—in the motor home, this would be the floor. Because of this fact, the CO/LP gas detector (Figure 3-9) is necessarily mounted close to the floor. To activate the LP-gas sensor

on this detector for the first time, remove the sensor activation strip, if such was not performed during the pre-delivery inspection.

If the alarm persists in re-arming and giving further alarms; ventilate the motor home (by opening doors and windows) and then check for possible LP gas leaks. If the leak cannot be readily found, then close the main valve to the LP tank and turn "off" all gas appliances and then take the motor home to a qualified service technician after the ventilation process is concluded and the doors and windows again shut.

Figure 3-9. CO/LP Gas Detector

Chapter

4

Major Appliances & Accessories

Refrigerator

The Allegro Bus motor home will contain a refrigerator manufactured by Norcold, Incorporated. However, certain floor plans may contain an **optional** residential refrigerator. The residential refrigerator is discussed below. **Note:** If the 12V system is off the refrigerator will not work.

When the refrigerator is in the "LP gas" mode, make sure that the main LP gas valve is in the "on" position before attempting to start the refrigerator. Please note that the refrigerator is equipped with a semi-automatic energy selector (AES) control system which can set automatically to switch between a 120-volt AC system or a LP-gas operation system.

Warning

The majority of LP gas appliances used in motor homes normally vent to the outside of the motor home. When your motor home may be parked in close proximity to a fuel pump (i.e., during re-fueling operations), it is possible that the fuel fumes could enter this type of appliance and possibly be ignited by the burner flame thereby causing a fire or explosion. Accordingly, please use extreme caution when re-fueling the motor home.

A 12-volt power supply (e.g., 12 VDC system of the motor home, auxiliary battery, converter, or motor-home engine battery) is required for proper operation of the electronic control panel. For electrical operation of the refrigerator, either the external electrical power line must be connected to the motor home or the on-board electrical generator must be running to provide the necessary 120-volt AC power. To operate the refrigerator in the LP-gas mode, the main LP gas valve must be "open."

Dometic Refrigerator

To start the Dometic refrigerator (Figure 4-1), on the control panel, press the main power "on/off" button. The refrigerator will be in "ON" mode when the button is in and "OFF" mode when the button is out. Press the Auto/Gas mode selector button to turn the AUTO mode "on" or "off." The Auto Mode will be "ON" when the button is in and "OFF" when the button is out.

The thermostat has five settings where "1" indicates the warmest and "5" the coldest temperature setting. Press the button once to display the current setting. Continue to press repeatedly until the desired setting, e.g. 3, is shown in the LED display. This value is shown for about 5 seconds and then the fresh food compartment temperature is displayed once again.

The Dometic refrigerator is equipped with an automatic travel latch that automatically locks the refrigerator's doors when the motor home's engine

Figure 4-1. Dometic 4 Door Refrigerator

is running. When the motor home's engine is turned off, the latch unlocks the doors. To open one of the refrigerator doors while the engine is running, the travel latch must be manually unlocked. To unlock, simply slide the shutter to the left. The doors will automatically lock again after five seconds.

When the engine is turned on, a signal through the alternator activates the travel latch which in turn locks the refrigerator doors. When turning off the engine, the doors will not open automatically as usual because the refrigerator is turned "OFF." In order to switch on the refrigerator, the doors must be manually unlocked.

When the refrigerator is turned off for a period of time, it is recommended that the refrigerator is emptied, defrosted, cleaned, and the doors placed ajar in the airing position. To ensure the doors stay in the airing position, use the automatic travel latch's airing position functionality:

- Open the refrigerator doors. Slide the shutter to the right. The automatic travel latch is locked.
- Gently close the doors until the pins click into position.
- Verify that a small spacing has been created between the cabinet and the doors and that the doors have not been closed completely. If so, unlock the latch and close the doors again.
- In order to open the doors again, the travel latch must be unlocked. Push to close the doors completely and then, slide the shutter to the left to unlock the latch.

Always keep the refrigerator clean. Cleaning the refrigerator is usually done after is defrosted or put into storage. Use a lukewarm, weak soda solution to clean the interior liner of the refrigerator. Use warm water only to clean the finned evaporator, gasket, ice tray and shelves. To keep the refrigerator operating efficiently, periodic inspection and cleaning of several components once a year is recommended:

- Check the lower vent, upper vent and area between these openings for any obstructions such as bird/insect nests, spider webs, etc.
- Make sure the refrigerator area is free from combustible material, gasoline, and other flammable vapors or liquids.
- If accessible, clean the coils on the back of the refrigerator. Use a soft bristled brush to dust off the coils.

Residential Refrigerator (Optional)

As stated earlier, certain floor plans will be equipped with a residential refrigerator (Figure 4-2). **Please note that the residential refrigerator will only operate on 110V.** Any time that the motor home is not connected to shore power, the refrigerator will have to be operated by use of the inverter.

Figure 4-2. Residential Refrigerator

The refrigerator has its own water filters for the ice maker. **NOTE:** These water filters have to be removed before winterizing your motor home.

NOTE: The ice maker must have RV antifreeze cycled through it for proper winterization.

For further instructions on how to properly operate and maintain the residential refrigerator, refer to the specific owner's manual located in the Owner's Information Package.

Note: The inverter must be "on" for the residential electric refrigerator to operate if not connected to shore power!

Microwave / Convection Range

The Allegro Bus contains a microwave/convection range (Figure 4-3). All microwave ranges operate on 120-volt AC electrical power, supplied either by the external electrical hookup or by the onboard electrical generator in the motor home.

Figure 4-3. Microwave / Convection Range

Touch-pad controls on the microwave range are used for operating the range (i.e., cooking temperature, mode, power level, and cooking time). For basic operating instructions on the proper use of the microwave/convection range, please consult the specific manual in the Owner's Information Package.

Air-Filtration Fan

In the Allegro Bus, the "exhaust" or air-filtration fan is built into the microwave and its function is to filter the air and exhaust to the outside. This range hood is equipped with a multi-speed fan and a light for convenient use. The hood should be used whenever any cooking is performed to filter any airborne cooking residues and heated air.

Additionally, the range hood can be used for supplemental filtration of other odors and gases including tobacco smoke, candle fumes, and related vapors. The range hood contains filters which can be removed and cleaned or replaced to assure sustained normal operation. Consult the particular owner's manual contained in the Owner's Information Package.

Cook Top

If your Allegro Bus has the All Electric option it will contain a two-burner induction cook top (Figure 4-4).

NOTE: The two-burner induction cook top requires 50 amp service or the generator to operate!

Your two-burner induction cook top surface is developed to be easy to use. The cook top can endure plenty of wear and tear if

Figure 4-4. Two Burner Induction Cook Top

proper care is taken to clean and operate the cook top as directed. The flat surface allows for easy movement of pots and pans safely with almost no risk of spills or overturning. **Please note that you must use pots and pans that are rated for use with an induction cook top for proper results.**

On the right hand side of the cook top the control panel is featured. ON/OFF refers to the appliance power, while HEATING/TEMP and TIMER refer to specific functions listed below:

HEATING—this is the default function of the induction cook top. When pressing ON/OFF, the heating light will illuminate and the cook top will heat the cookware at 1200W. The heat can be adjusted by touching the "up" or "down" arrows. There are ten levels of power, with 10 being the highest.

TEMPERATURE—when pressing TEMP, the induction cook top will begin setting the temperature and the TEMP light will illuminate. The default temperature is 248º (120ºC). Temperature can be adjusted by touching the "up" or "down" button. Note that the temperature range is 140º to 464º (60ºC to 240ºC).

TIMER—when pressing TIMER, the light of the TIMER and one of the lights on HEATING/TEMP will illuminate accordingly. The cook top will enter the Time Setting mode. Five seconds after setting, the window will automatically shift to the mode display of the corresponding function. To view the countdown time, press TIMER again. The display window will show you the remaining time.

TELEVISION SYSTEM OPERATION

Television Antenna

You can automatically search for channels that are active in your area by editing and scanning channels on your remote control. To do this you will need to:

- Press the power button to turn the television ON
- Select English, press "OK"
- Select home use, press "OK"
- Select Cable or Antenna, press "OK"
- Select Start, press "OK"
- Auto programming will begin
- When scanning is complete, press "OK"

If you do not receive the desired channels, re-direct the Antenna with Control located in the upper cabinet in front of the passenger seat. After re-directing the antenna, you must rescan channels.

Television Satellite Dish Control (*Optional*)

The RV may be equipped with a TV Satellite Dish control system (Figure 4-5) to permit access to satellite television. If your motor home is equipped with an optional satellite dish it is capable of receiving High Definition (HD) satellite signal from Dish Network. . However, you must subscribe to HD service and install a HD receiver. Factory installed satellite dishes must have a HD receiver in order to obtain a clear picture. Your satellite dish will not receive High Definition programming from Direct TV; however, it is capable of receiving standard definition programming from Direct TV's Satellite 101.

Figure 4-5. Dome Satellite

Follow the directions in the Owner's Manual for this dish-control mechanism to obtain the best orientation of the satellite dish for desired television reception. Remember, that any additional movement of the motor home after the satellite dish control has been set may possibly cause degradation or loss of satellite-television reception. In this case, please re-adjust the satellite dish to re-align that dish for optimal television reception.

Television Sets

Your motor home is High Definition (HD) ready and is capable of receiving channels that are broadcasting in High Definition. In order to receive a clear picture from your satellite dish, you must install a high definition receiver and subscribe to high definition (HD) service. Your motor home does not feature a manual switching box, therefore in order to change from satellite to DVD or TV antenna, please follow the directions listed below:

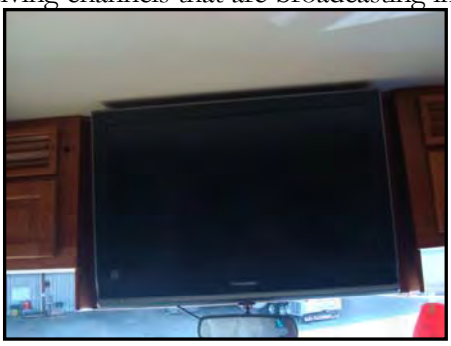

Figure 4-6. Television Set

To change the mode of your television, press "INPUT" on your remote control. Then select TV, DVD, or Satellite, and press "OK."

NOTE: The booster must be "on" for ANT (a green light will appear) and "off" for the cable. The booster is located in the front-right cabinet of your motor home

The television sets (Figure 4-6) are located in different areas of the motor home. Some are standard TV sets and some are optional TV sets depending on your specific floor plan. All TV sets are High Definition.

The television are powered by 120-volt AC electricity; therefore, the motor home must either be plugged into an external source of AC power or using on-board power from the generator. An optional inverter would also permit the 12-volt DC power to be converted into 120-volt AC for the television(s).

Detailed operation of the television(s) is provided in the accompanying owners manuals found in the Owner's Information Package included with the motor home.

Generic operations of the television would include a basic "on/off" switch, volume "up/down" control, channel "up/down" selector, and menu "up/down" selector—these functions are found both on the television set itself and on the accompanying remote that comes with the television set.

If the motor home has been wired for satellite TV, there should be an interior jack or jacks and an exterior jack to connect the satellite system. Consult your owner's manual for the satellite system to determine the correct connections to be made.

Infrared Repeater

The Allegro Bus will feature an infrared repeater (Figure 4-7) which enables the owner to utilize the satellite remote control from various areas of the coach. An infrared repeater will be located next to each TV. If your Allegro Bus has the optional outside entertainment system, an infrared repeater will be located on it also.

Figure 4-7. Infrared Repeater

To utilize the infrared repeater, locate the one inside the cabinet (Figure 4-9) that contains the DVD player. Peel the adhesive backing from the back of the infrared repeater and line the infrared repeater against the satellite receiver's infrared repeater. This will allow the infrared repeater to operate when the satellite remote control is directed toward the infrared repeater situated next to the TV. You will now have the convenience of changing the satellite receiver channels from various areas of the coach.

NOTE: The infrared repeater will not work with a Dish Network receiver.

AM / FM / CD Stereo System

Your motor home will be equipped with an AM/FM/CD stereo system (Figure 4-8). This system is powered by the 12-volt DC system of the motor home and operates like any conventional car-stereo system (see Owner's Manual for specific instructions). To properly operate the stereo system, it is important that you read the information provided with the system.

Figure 4-8. AM/FM/CD Stereo System

To turn the AM/FM/CD stereo system on and off, push the "POWER" button.

To select a Play Source such as the radio, CD, external CD changer, or auxiliary sources, pushes the "Mode" button to choose the desired play source.

Sound Settings:

Volume: Rotate the VOLUME knob left or right.

Bass, Treble, Balance or Fader: Push the VOLUME knob to scan between the different sound controls. Once the desired function is in the display area rotate the knob left or right to achieve the desire level.

Equalizer: Push the EQ button to choose between preset equalizer settings: Classic, Rock, DSP Off (digital sound processor off), Flat, Pop and Jazz, as indicated in the display area.

Mute: Push the MUTE button to mute the volume level. Press again to return to previous volume level.

Loudness: Push the LOUD button to boost high and low tones at low volume levels.

Manual Tuning:

Push the TUNE button until "NORMAL" appears in the display.

Rotate the TUNE knob to select a station from 01-182.

Category Tuning:

Push the TUNE button until "CATEGORY" appears in the display.

Push button 1 or 2 to find the desired category.

Rotate the TUNE knob and select a station.

Direct Tuning:

Push the TUNE knob until "DIRECT" appears in the display.

Rotate the TUNE knob and select the first digit (0 or 1).

Push the TUNE knob again.

Rotate the TUNE knob and select the second digit (1-8).

Push the TUNE knob again.

Rotate the TUNE knob and select the third digit (1-9). The tuner will start playing the station you have selected when the third digit stops flashing.

Note: Satellite radio signal may be blocked by trees, buildings, bridges, or tunnels.

To operate the AM/FM/Weather Band, push BAND button to select F1, F2, F3, AM1, AM2, or W (weather band).

Manual Tuning:

Rotate the TUNE knob left or right and hold until "MANUAL" appears in the display then release knob.

Rotate the TUNE knob again left or right until the desired radio station appears in the display.

Scan Tuning:

Push the TUNE knob to scan every 5 seconds for a different radio station. To stop scanning push the TUNE knob again.

Seek Tuning:

Rotate the TUNE knob left or right then release to seek for a different radio station.

Weather Band: Push the W-BND button for instant weather band operation.

NOTE: Push the MODE button to return to playback of other sources.

Programming AM/FM Stations: Select a radio station then select a button 1, 2, 3, 4, or 5 and push and hold until it beeps. The radio station is now programmed to that button.

Recalling Programmed Radio Stations: Push button 1, 2, 3, 4, or 5 to recall a pre-programmed station.

Clock Settings

Display Button: Push and hold the DISP button until the clock is flashing in the display.

Adjusting the Minutes: Rotate the TUNE knob to the Left to adjust the Minutes.

Adjusting the Hours: Rotate the TUNE knob to the Right to adjust the Hours. Note the AM/PM indicator.

NOTE: When correct time displays wait a few seconds to allow the time to program.

CD Operation:

Playing a CD: Insert a CD (label side up) into the CD slot. The CD will auto-load and start playing. NOTE: If a CD does not auto-load, DO NOT FORCE into the slot, as you may already have a CD loaded.

CD Track Selection: Rotate the TUNE knob left or right to change the track.

Ejecting a CD: Push the EJECT button to eject a disc.

Pausing a CD: Push the MUTE button to "Pause" disc, press again to resume play.

CD Changer (optional):

Load CDs: Insert the CD magazine into the external CD changer.

Selecting the External CD Changer: Push the MODE button until "CDC" appears in the display.

CD Selection: Push button 1 or 2 to scroll through the selection of CDs in the CD changer. If a CD is not in one of the trays, the unit will continue until the next CD is found.

CD Track Selection: Rotate the TUNE knob left or right to change the track.

Reset Button:

The radio panel or LCD display may fail to function normally due to the vehicle's battery condition, and may require resetting the microprocessor if:

The vehicle has been "jump started" from a dead battery condition.

The vehicle battery becomes very low and is quick-charged.

The vehicle battery is removed and replaced.

Should this condition occur, simply press and release the RESET button on the radio panel using the tip of a ball point pen. All station programming should remain, but you will have to reset the clock.

Navigational System

The optional in-dash navigational system (Figure 4-9) will assist you in marking a route to a destination or destinations on a map, guiding you along the route to the destination. The GPS (Global Positioning System) uses communications satellites launched by the US Department of Defense. Signals are received from three or more satellites orbiting at 21,000 km altitude, and the principle of triangulation is used to find the position. By receiving GPS signals, this system can position the vehicle within a margin of error of 30 to 200 m.

Figure 4-9. Optional In Dash Navigational System

Reception may not be possible in locations such as: in tunnels; between tall buildings; under elevated roads; or between trees.

Your navigational system is designed and manufactured to ensure a minimum of maintenance. Use a dry soft cloth for routine exterior cleaning. Never use benzene, thinner, or other solvents. When the unit is dirty, wipe the surface of the display using the supplied wiping cloth. **NOTE:** If water drops or similar wet substances get inside the monitor, it may cause a malfunction. Since there is the possibility of water drops getting inside of the unit, do not directly apply cleanser to the surface. Do not scratch the screen with your nails or other hard objects. The resulting scratches or marks will obscure the images.

Home Theater System

The motor home has a contemporary, home theater system (Figure 4-10) which offers true surround sound for the front television and also when DVD programs are viewed featuring the Dolby Surround Sound system. This system, though, does not permit playing through the rear entertainment system in the bedroom. As this home theater system offers many types of entertainment options, it is worthwhile to read the manual thoroughly before attempting extensive use of this system. This system will also play CDs and MP3 disks, among other media.

Figure 4-10. Home Theater System

Cable & Telephone Jack

The Allegro Bus contains an exterior cable jack and also a telephone hookup (Figure 4-11). This telephone connection permits the owner to access external telephone services (e.g., RV parks) so that these services are available for use within the motor home proper.

Within the motor home there are several telephone jacks (e.g., bedroom, living room) for connecting telephone(s), as desired.

Figure 4-11. Telephone Jack

Dishwasher (Optional)

The Allegro Bus may be equipped with an optional compact dishwasher (Figure 4-12). If such is installed, the following operating instructions may be used to operate that dishwasher:

1. Load the dishes (be sure to remove all food scraps and other materials such as paper napkins or towels).

2. Add desired detergent and rinse-aid solution.

3. Press the "power" button to turn the dishwasher "on" (pushing this button again will then also turn the dishwasher "off."). Note: Merely opening the dishwasher will automatically turn "on" the dishwasher for a 30-second period. To end a wash cycle before it's fully completed, press the "power" button; at which time the dishwasher will pump any remaining water in the dishwasher out of the unit.

Figure 4-12. Dishwasher (Optional)

4. Select Wash Program. By pressing the "program" button, the desired wash cycle can be selected. The dishwasher will remember the last selection made until a newer one is selected.

5. Check to assure that the drain filter is flush with the filter plate and the spray arm can rotate within the dishwasher freely without impacting anything.

6. Start the dishwasher by closing the dishwasher door; then press the "start/pause" button to begin the washing cycle. This button also has a "delay start" function, as desired.

7. Pause the dishwashing cycle, if desired, by pressing the "start/pause" button; wait for three beeps to be heard, then one can safely open the dishwasher. Restart the dishwasher (after closing the door) by pressing the "start/pause" button. Note: Forcing open the dishwasher door in mid-cycle may cause damage and/or injury.

8. Finish the dishwashing cycle by noting when the dishwasher beeps six times to indicate the end of the wash cycle. At the end of the washing cycle, the drying fan will continue to run for a pre-determined time or until the door is opened. The drying fan assists in drying the washed contents and actually uses very little electrical energy in the process. It is normal for some water to remain in the drain filter area after the wash cycle is completed.

Note: Should a power failure occur when the dishwasher is operating, the dishwasher will stop. It may be impossible to open the dishwasher, depending on where it was interrupted in the dishwashing cycle. When the power is again re-applied, the dishwasher will resume its operation at the point where it was interrupted. When not in actual use, the dishwasher can be used to store dishes, cups, glasses, and the like; as the dishwasher itself provides secure storage of these items while in transit.

Warning

The dishwasher must have 110 power or inverter power at all times to be locked during transit. If not, the dishwasher could disengage during travel.

To ensure that the dishwasher is properly locked for travel, follow the steps below:

1. Push the center control, located on the face of the dishwasher, until it blinks green. Press down on the key button to the right of the center button until it turns red and compresses. This denotes the dishwasher is in "lock down" mode.

To decompress the dishwasher, simply push the key button for five (5) seconds and it will decompress.

Water Heater

Warning

DO NOT APPLY 110 VAC POWER to or LIGHT the water heater until after the water heater is filled with water and the water lines and heater tank are purged of any trapped air. Failure to do so will damage the water heater and may cause additional damage to the motor home.

Before the water heater (Figure 4-13) is to be used, first fill the fresh water system and purge the water lines to and from the water heater by opening all the hot-water faucets until water steadily flows from each one and no "spurting" or "hissing" sounds are further heard. The water heater holds 10 gallons of water and uses either the LP gas system or the 120-volt AC electrical system to operate the heater.

Proper and safe operation of the water heater requires that all safety information provided in the owner's manual be read and understood before placing the water heater in service. Take the time to become familiar with this manual (provided in the Owner's Information Package).

The water heater is designed for operation either with LP gas or 120-volt AC electricity. Both modes of operation are now presented.

Figure 4-13. Typical Water Heater

LP Gas – Electronic Ignition Operation (6-Gallon and 10-Gallon Models)

1. Turn the remote switch to the "on" position.
2. If the remote-switch light stays "on" longer than 15 seconds, turn the remote switch to the "off" position and wait 5 minutes.
3. Repeat Step One.
4. (**For 6-Gallon Models only**): For complete shutdown and also before any servicing:
    a. Turn the remote switch to the "off" position.
    b. Remove the red wire from the left-hand terminal of the ECO switch (ECO to valve).
5. If the water heater fails to operate because of high water temperature, the heater will go into a lockout condition (indicator light "on"). When the water eventually cools, reset the system by turning the switch to the "off" position for at least 30 seconds, then turn the switch back "on."
6. If a lockout condition persists, contact your authorized dealer.

120-Volt AC Electrical Operation

1. For electrical operation, use the power switch on the water heater; depending on the particular model, that switch may be located either at the front or at the rear of the water heater.
2. Completely fill the water heater with water and purge the hot-water lines of any trapped air.
3. Turn the power switch located on the water heater "on." NOTE: Turning the power "on" to the water heater without having previously covered the water-heating element with water may quickly burn out the element and void the warranty.
4. After awhile, check the water heater for proper operation; the water temperature should be approximately 140°F (60°C).
5. If the manual-reset, high-temperature-limit switch should trip the circuit breaker; reset the switch by depressing the reset button--use a pencil or other non-metallic object to depress the reset button. If the

high-temperature-limit switch should again trip the circuit breaker, contact an authorized service technician or an authorized dealer.

6. Both the electrical and gas operations of the water heater may be used simultaneously to reduce recovery time of heating water up to desired temperature.

For general maintenance of the water heater or specific information about select steps in operating the water heater, please refer to the owner's manual for this appliance contained in the Owner's Information Package.

Warning

DO NOT STORE any combustible or flammable substances near or adjacent to the water heater. Provide adequate space for ventilation and air circulation.

Water Heater Storage

If the motor home is to be stored during the winter months, the water heater should be drained (see Figure 4-14) to prevent damage caused by freezing water contained in the water heater. To drain the water heater, first turn "off" all electrical power, turn "off" the LP gas going to the water heater, then turn "off" the water pump. Open both the hot- and the cold-water faucets to drain the water lines and open the drain plug [lower center of picture] on the water heater to drain the entire system.

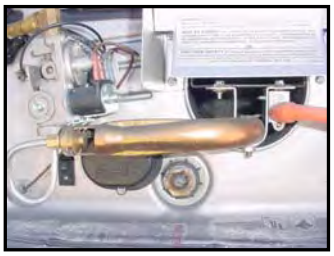

Figure 4-14. Water Heater Drain

When re-activating the water heater after the motor home is taken out of storage, make sure that the entire water system, including the water heater, has been filled with water and the lines have been purged of any entrapped air before relighting the water heater. Failure to do so may allow the water-heating element to be turned "on" before such is immersed in water; thereby, causing the premature failure of the heating element and voiding the warranty.

Tankless Gas Water Heater

Your coach may be equipped with an optional tankless gas water heater (Figure 4-15). The tankless gas water heater provides instantaneous hot water as needed. To operate the tankless gas water heater you will need to follow the directions listed below:

- Pressurize the water system by turning on the pump or city water pressure
- Purge all air from system by turning on the taps until a steady stream of water flows from the taps. Turn off the taps.

Figure 4-15. Tankless Gas Water Heater

- Turn on the 12 VDC power supply. This is labeled "Water Heater" and is located in the cabinet above the driver seat.

- Turn on the propane supply at tank and the manual gas valve if installed in system. Please note the heater will remain dormant until a water tap is opened and the heater senses a water flow of at least 0.4 GPM.

- Turn on hot water tap. The heater will fire up within two seconds and hot water will flow from the tap in the time that it takes to get through the plumbing from the heater to the tap. Hot water delivery will continue as long as the water is flowing. (NOTE: You may have to turn the water on and off several times to bleed the air from the LPG line before the water heater fires up.) If the heater fails to light after several ignition attempts, turn the power to the unit off, wait five seconds and turn the power on again.

- Close the hot water tap and heater will shut off.

NOTE: When using an "on/off" button on a shower head or an outside wash down box, always turn off the hot and cold water valves when finished. Not doing so will result in cold water bleeding into the hot water system and causing the water heater not to ignite. Cold water or alternating warm and cold water will result.

IMPORTANT!

The tankless water heather is not designed to be used while the motor home is in motion! Doing so will cause permanent damage to the ignitor.

The tankless gas water heater is designed to give a continuous flow of hot water as long as required and maintain the approximate set temperature through all flow rates within the capacity of the heater (85º temperature rise per GPM). The heater will not fire at very low flows; i.e., under 0.4 GPM.

It is recommended that even when dry camping, take a real shower and leave the water running as you would at home. You won't run out of hot water and you won't have to waste water waiting for the cold water to purge from the water line every time the water is turned back on. RV showerheads are designed to drip when turned off and will allow the hot water line to be filled with cold water.

WARNING: Always turn off the 12-volt power supply to the heater during any fueling operations. Operating this water heater or any other ignition source during fueling could case a fire or explosion, which could result in serious injury or death.

NOTE: Should overheating occur or the gas supply fails to shut off, turn off gas valve at the supply tank. Immediately call a qualified service technician.

Do not use this appliance if any part has been under water. Immediately contact a qualified service technician to inspect the appliance and replace any part of the control system and any gas control, which has been under water.

For routine maintenance, all faucet aerators and showerhead screens should be cleaned regularly. It is also recommended that your tankless gas water heater should be inspected by a qualified service technician at least once a year. Particular attention should be paid to the following:

- Be sure that the air inlet openings and flue area are clear of any debris or obstructions (leaves, bug nests, spider webs, etc.)
- Check that heater mounting is still secure to the coach and there are no areas for potential water leaks.
- Open the cover of the heater and inspect for debris or obstructions under the burner or in flue hood.
- Visually inspect wiring. Be sure there is no chafing of the insulation. Be sure that the direct spark ignition cable (yellow) wire is secred to the electrode under the burner and that the connector is not touching anything.
- Check seat on front lip of electronics drawer to be sure that it still seals when drawer is shut. Check that all case sealing grommets are secure and not leaking.
- Check for soot around the flue. Soot is a sign of incomplete combustion and a qualified service technician should be notified to correct the problem.
- The pressure relief valve should be manually activated at least once a year by moving the lever on the top of the valve 90º. Never perform this operation while the burner is operating. Water will flow freely from the valve and could cause scalding.

NEVER plug the pressure relief valve. If the valve is actuating too frequently, contact the manufacturer of the tankless gas water heater.

The tankless gas water heater is equipped with self-diagnostics. In the even the red LED is flashing please refer to the Service Codes section of the respective manual that comes in the owner's information package. Most problems are easily remedied by consulting the trouble-shooting guide. If problems still persist, contact the manufacturer or an authorized service center. Only a qualified technician should do any work involving the gas system.

Some common trouble-shooting situations are listed below:

Heater does not come on when the water turns on. Green LED not flashing.

- Be sure all electrical connectors are secure and the polarity is correct. (Red wire to positive terminal) of RV electrical panel.
- Be sure power is on and the panel breaker is not tripped.

- Check electrical contacts in electronics drawer. Be sure the connector with red and black power wire is plugged into board. Using a voltmeter, check for 12 volts on this connector.

- The fusible link in this wire might be blown. Replace power cord.

- Be sure there is a battery in the system. Never connect the heater directly to a power converter. Some converters have circuits that are not pure DC. (See the tag on red and black power wire on the back of heater).

Green LED flashing but heater does not come on when water flows.

- Be sure that no water-mixing valve has been left in the on position, using the showerhead as a shut off. This will permit water to bypass the water heater and bleed cold water into the hot water system. Always turn off both hot and cold water valves after using. Be sure that the bypass valve at the water connections is in the "off" position.

Heater does not come on when the water turns on. Red LED is flashing a series of three red flashes, or a double red flash.

- The T-Mid thermister (pair of yellow wires going to heat exchanger) is not connected or defective. Be sure wiring harness connectors are secure and that wires are not chaffed. Be sure connector is secure on electronics board. If these are secure, re-power unit. If the red LED still flashes, contact the manufacturer for a replacement thermister probe.

Green LED is flashing but there is no ignition when water is on on.

- Be sure the gas valve at the tank is "on" and there is gas in the tank.

- Be sure that gas is turned on and water flow is at least 0.4 gallon/minute.

- Check that yellow ignition wire is clipped to the spark electrode terminal and is not touching anything else. Align so that it is not in contact with anything but the terminal.

- With water running, check that the paddle wheel in the flow meter is turning counter-clockwise. This can be visually observed with the access door open by looking through the clear window of the flow meter.

  If it is not turning with the water flowing, there is an obstruction in the flow meter. Remove the clear cover of the flow meter by firmly pushing on the cover and turning counter-clockwise (approximately 1/8" turn) to remove the plastic cover. Remove the paddle, taking care not to lose the "O" ring seal and the pin that the paddle rotates on. Remove any debris and re-assemble by reversing the procedure.

  To secure the window, line up the guides, firmly push to seat and turn clockwise.

- Check flame site hole to see if igniter is sparking from the probe to the burner. Bend ignition wire to adjust to proper gap or contact the manufacturer or the nearest authorized service representative.

There is no ignition. Red LED is flashing a series of seven flashes.

The ignition has locked out. Check for these possible causes:

- Locate the high temperature switch (two light blue wires) at the upper right hand of the heat exchanger. Push the reset button in the center of the switch. (Early models only; newer models have an auto reset).

- Check that the yellow ignition wire is clipped to the spark electrode terminal and is not touching anything else. Check that there are no cuts or breaks in the yellow wire. Align it so that it is not in contact with anything but the terminal.

- Excessively high or turbulent winds may cause the burner to extinguish. Adjust the position of the vehicle relative to the prevailing wind.

Heater turns on but temperature fluctuates erratically.

- Hot and cold water lines are reversed on back of heater. If the flow meter rotor is not rotating counter-clockwise, pipes are connected in reverse. Be sure hot water is connected to bottom fitting and cold to the top fitting.

- May be caused by excessive restriction at the water outlets, showerheads, aerators or water strainers. These should be cleaned and the showerhead flow restrictor removed as defined in "Recommendations for Water System Installation."

- The *Variflame* gas modulating valve is out of calibration. Consult the manufacturer.

Heater does not ignite when water is turned on.

- The gas flow may be too low due to an improper gas line diameter (under 3/8" outside diameter). The gas line may be excessively long (over 20 feet) or the on/off solenoid at the tank (if you have one) may have an orifice that is too small (under 3/16" of an inch).

Heater comes on but rapidly cycles on and off.

- Water flow is too low. Increase flow at a tap. Clean all aerators and shower head screens.

- Water pump is not functioning properly. Repair or replace pump.

- If the heater cycles as the pump cycles, a pressure accumulator tank is needed in the water system. If you have an accumulator tank, check to see if it has become filled with water. If it has, drain it so that it contains air only.

- Air is in the water line. Bleed air by turning on all water taps.

Heater ignites but water temperature is too low.

- Check thermostat setting.
- The water flow may be so high as to exceed the capacity of the heater particularly if your supply water is very cold. Slow the water flow.
- The heater may be subjected to excessively strong winds, cutting the efficiency. Shield from wind or change the location of the unit.
- The gas pressure may be too low. Check the regulator pressure. The LPG pressure should be 11 water column inches, (WCI) while the heater is running. A gas-testing gauge should be installed on the manifold tap so that it may be read while heater is running. If it is too low, turn up the gas regulator to the proper pressure. Be sure the gas flow control valve is in full "on" position. This should only be done by a qualified technician.
- The gas flow may be too low due to improper gas line diameter (under 3/8" outside diameter). The gas line may be excessively long (over 20-30 feet) or the on/off solenoid at the tank (if you have one) may have an orifice that is too small (under 3/16" of an inch).
- Check the heater for an airflow obstruction and clean.
- Check the two conductors, black and white to the modulating valve. It should be securely plugged in to the control board terminal.

Water temperature is too hot or no temperature control.

- The thermostat is set too high.
- Fuel tank regulator is set too high. Have the regulator checked by a qualified technician.
- Be sure that the hot and cold water lines are not reversed on the heater hook-ups. The unit will not function properly and water could become extremely hot.
- If water temperature reaches 165ºF, the high temperature limit switch (ECO) will trip, shutting the heater down. Locate the high temperature switch (two light blue wires) at the upper right hand of the heat exchanger. Push the reset button in the center of the switch. (Early models only. Newer models have an auto reset ECO).

Low heat rise. Excessive water flow is required to trigger water heater.

- If you find that your heater requires excessive flow to activate it (over ½ gallon per minute), it is likely that you have cold water bleeding into the hot water side of your water system. Check that valves and faucets are closed when not in use. If there is an on/off button on your showerhead, always turn the water valves off after the shower to prevent cold water from bleeding into the hot water system. This will keep the heater from functioning properly.

If any problems persist, contact an authorized service center or the manufacturer.

FOR YOUR SAFETY

DO NOT store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:

Extinguish any open flame.

Shut off the gas supply at the gas container or source.

Do not touch any electrical switch or use any phone or radio in the vehicle.

Do not start the vehicle's engine or electrical generator.

Contact the nearest gas supplier or qualified service technician for repairs.

If you can not reach a gas supplier or qualified service technician, contact the nearest fire department.

Do not turn on the gas supply until the gas leak(s) has been repaired.

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IMPORTANT!

DO NOT disconnect the electrical supply, turn off the propane supply or disconnect the cold pack power when temperatures are near or below freezing. The tankless gas water heater WILL NOT work if the electrical power source or propane is disconnected.

Pressure-Relief Valve

The relief valve (Figure 4-14, upper half) for over-pressure and over-temperature conditions is located on the exterior of the water heater. This valve will operate if the water temperature reaches or exceeds 210°F or if the water pressure reaches or exceeds 150 psig. Since the water system in the motor home is a closed system when all water valves are shut, the water-heating cycle can raise the temperature (and, consequently, the pressure) of the water in the water heater; thereby realizing pressure increases approaching 150 psig. Should this pressure be reached, the pressure-relief valve will begin "weeping," that is, minor dripping or leakage from that valve until the pressure drops below 150 psig, at which time the pressure-relief valve will re-seat itself and restrict the water flow. This is normal operation and should not be a cause for alarm. Do not obstruct or block the pressure-relief valve in any way, as this would keep the valve from functioning normally and protecting the hot water system.

Hydro-Hot Heating System *(Optional)*

Depending on what model your Allegro Bus is, it may feature a Hydro-Hot heating system (Figure 4-16) that provides a continuous, on-demand supply of domestic hot water, as interior zone heating where and when it is needed. Both heating features are accomplished by a unique VDC-Powered Diesel-Fired Burner and a VAC-Powered Electric Heating Element (120 VAC). These two heating sources maintain the temperature of the Hydro-Hot's solution of water and antifreeze.

Figure 4-16. Hydraunic Heating System

To activate the optional Hydro-Hot heating system, the hydro-hot switch (labeled "diesel burner switch") located in the side cabinet above the driver's seat must be activated. By activating this switch, a supply of hot water as well as interior heat can be provided. The heating feature will be controlled by the thermostat mounted on the wall. It is operated off the furnace function of the thermostat to provide interior heat. Hot water will be supplied instantaneously and continuously at any time the diesel burner switch is activated.

If interior heat and hot water are demanded from the Hydro-Hot system at the same time, hot water will simultaneously take precedence over interior heat; therefore causing the interior heat to shut down and turn off until the water flow is turned off from water sources.

Figure 4-17. Surge Tank

Also featured in the Hydro-Hot system is an electrical burner switch. With this switch activated and shore power available, it will supply a very limited amount of hot water and some interior heat.

The surge tank (Figure 4-17), located in the basement, should be routinely inspected to make sure

Figure 4-18. Control Panel

the antifreeze fill line stays in the acceptable zone. If the antifreeze becomes low, you must add the recommended antifreeze stated in the Hydro-Hot's owner's manual. If antifreeze is totally depleted from the surge tank, a switch will be released inside the main Hydro-Hot tank disabling the system from operating. Antifreeze will then have to be added to the tank to rectivate the switch and allow the system to operate.

If batteries accidentally become discharged and the Hydro-Hot system is activated, the system will automatically shut down before batteries are totally discharged. Once power is restored to batteries, the system must be reset by depressing the reset button the control board (Figure 4-18).

For detailed instructions on operating the Hydro-Hot Heating system, refer to the specific owner's manual found in the Owner's Information Package.

Caution

Yearly maintenance is required on the burner portion of the Hydro-Hot heating system.

Caution

Your Hydro-Hot heating system operates off the coach's sole diesel tank! Keep in mind that the Hydro-Hot fuel tube is located higher up in the diesel tank than the coach's engine fuel in order to prevent complete depletion of the diesel fuel tank. Be sure an adequate amount of fuel is in the fuel tank before dry camping.

Caution

DO NOT operate the Diesel-Burner and/or the Electric Heating Element without the water and antifreeze solution in the Hydro-Hot's Boiler Tank. Failure to do so will cause serious damage to the Heater.

CB Radio System Antenna Connection

The Allegro Bus comes equipped with an antenna and coaxial-cable connection (Figure 4-19) to enable the owner to install a Citizens Band (CB) radio of choice and operate it conveniently from the Allegro Bus. The coaxial-cable connection for the radio is found beneath the dashboard on the driver's side. Accordingly, with an owner-provided CB radio, that radio can be used to communicate with other travelers on the road. To install and use the one's CB system of choice, simply follow the directions furnished with the CB radio. (Note: Channel 11 is considered an emergency channel and monitoring this channel may give one information about road conditions, accidents, and related matters potentially affecting the travels of the motor-home operator).

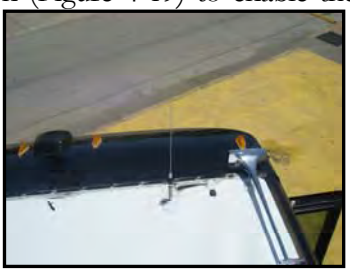


Figure 4-19. CB Antenna Installation

To talk with someone, simply press the "push-to-talk" switch and speak. To listen to any reply, release the "push-to-talk" switch and listen to the speaker. Remember that communications are "one-way," not "two-way" simultaneously—one must talk, then allow some listening time for others to talk. Consequently, it's better to make brief transmissions and allow others to comment; rather than making prolonged speeches and possibly not having anyone answer. Observe the common courtesies (see the owner's manual for more details) and acceptable speech. Several states have their Highway Patrols monitor the CB frequencies (check for exact channels for each state of interest) to learn about highway problems and emergencies. Be aware of these throughout one's travels in the event that they may be needed.

Triple Vision Camera Monitor System

The rear-view monitoring system (Figure 4-20) is provided to aid the driver in backing and parking the motor home. A camera mounted on the rear of the vehicle feeds a televised view of the rear of the motor home to the monitor located in the front near the driver. If the mode switch is in the "manual" mode, the monitor will be "on" when the ignition switch is turned "on." If the mode switch is in the "automatic" mode, the monitor will display the picture from the rear-mounted camera only when the transmission is in "reverse" gear. To use this system effectively, please consult the owner's manual for this system; this manual is in the Owner's Information Package.

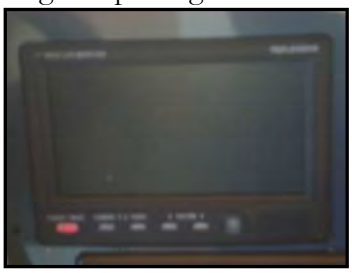


Figure 4-20. Rear-View Camera Monitor System

Warning

Do not view TV or video programs while driving.

Cleaning and General Maintenance:

1. If your Phaeton has been parked in direct sunlight resulting in a considerable rise in temperature inside the motor home, allow the unit to cool off before operating.

2. When the casing becomes soiled, clean it with a soft cloth dampened with a mild detergent solution. Never use abrasive cleaners or chemical solvents, as they might damage the casing.

Basic Rear View Camera Operation:

1. Depress the **POWER** switch. The picture appears on the monitor. **POWER** indicator light up green To turn off the picture, press it again to release. The monitor become standby condition. **POWER** indicator light up red.

2. Adjust the **VOLUME** control.

3. Adjust the picture contrast and brightness. The **DAY/NIGHT** selector switch should normally be kept in the **DAY** (released) position. When you view the picture at night or in a tunnel, etc., depress the switch to make the picture less bright (therefore in the **NIGHT** position). Thus, the picture will be easy to view even in a dark place.

When you set the gear level to the "R" position with the **POWER** switch released: The monitor is turned on and the picture from the camera connected to the CAMERA "A" connector appears irrespective of the **INPUT** knob setting.

Warning

Note on the power of the monitor: When you press the POWER switch to release, the monitor becomes standby condition. The power is not turned off until you set the ignition key to the OFF position.

Warning

About the Liquid Crystal Display (LCD) panel:

Do not press on the LCD panel on the monitor unit as doing so can distort the picture or cause a malfunction. The picture may become unclear, or the LCD panel may be damaged.

Clean the LCD panel with a slightly damp cloth. DO NOT use solvents such as benzene, thinner, commercially available cleaners or antistatic spray.

Warning

If your motor home is parked in a cold or hot place, the picture may not be immediately clear. The monitor is not damaged. The picture will become clear after the temperature in your motor home becomes normal.

Some stationary blue or red dots may appear on the monitor. These are called bright spots, and can happen with any LCD. The LCD panel is highly sophisticated, and more than 99.99% of the segments used in the panel are flawless. However, there is a possibility that less than 0.01% of the segments is defective and may not light up properly. However, these segments will not interfere with your viewing.

Side-Mount Camera

As an enhanced aid to driving, the Allegro Bus motor home will feature side-mounted cameras (Figure 4-21) on both side view mirrors. These side-mounted cameras are activated whenever the motor home in transit begins to make a turn. When the "left" turn indicator is used, the left-side camera is activated and that camera displays on the back-up monitor a rearward-oriented view of the driver's side showing that side of the motor home and a limited panorama of what is alongside and immediately behind the motor home as it begins to turn into that direction. In this manner, the typical "blind spot" of most motor homes is drastically reduced or eliminated so that the driver can make those turns with greater confidence. Similarly, the "right" turn indicator operates in the same manner to show a rearward view of the right side of the motor home when a right hand turn is made.

Figure 4-21. Side-Mounted Camera

Stacked Washer/Dryer (Optional)

Your Allegro Bus may be equipped with an optional stacked washer/dryer (Figure 4-22). The optional stacked washer/dryer can operate on 30 or 50 amp service. It is not recommended to operate the washer or dryer while traveling as this could damage

Figure 4-22. Stacked Washer/Dryer (Optional)

internal components. For specific information regarding the use of the stacked washer/dryer, consult the owner's manuals found in the Owner's Information Package.

Note: The 1 ½" gray water valve at gray tank waste gate must be fully open when operating the washer/dryer. For specific information regarding the use of the washer or the dryer, consult the owner's manuals found in the Owner's Information Package.

Carbon Monoxide/LP Gas Detector

To protect the driver and other occupants of the motor home, the Allegro Bus is equipped with a carbon monoxide/LP gas detector (Figure 4-23). Carbon monoxide (CO) is a colorless, odorless, tasteless gas which, when breathed, bonds to the hemoglobin in the red blood cells and, thus, drastically reduces or blocks the transfer of oxygen from the lungs to the rest of the body. In sufficient concentrations, CO kills by asphyxiation. In lesser amounts, CO makes the victim groggy, lethargic, and unable to think clearly or quickly.

Figure 4-23. Carbon Monoxide/LP Gas Detector

CO is one of the products of combustion for many materials including petroleum-based products (e.g., gasoline, diesel fuel, propane, butane; among others). Since many of the appliances and the engines associated with the motor home produce CO in their normal operations, it is necessary to assure that CO levels do not rise to dangerous levels within the motor home. In sufficiently high concentrations, CO can kill in minutes.

Consequently, the CO/LP gas detector should be checked at regular intervals to assure it is in proper operating condition and that its battery is fresh. Periodic checking with the "test" button to assure normal operation of the CO/LP gas detector and to allow the motor-home users to hear how the CO/LP gas alarm actually sounds would be worthwhile.

The most susceptible people to CO poisoning are unborn babies, small children, pregnant women, senior citizens, and people with cardiovascular or respiratory problems. Consequently, it is prudent to check the CO monitor regularly for normal operation and to remain aware of the symptoms of CO poisoning which include dizziness, nausea, vomiting, muscular twitching, throbbing in the temples, incoherent thinking and speech, weakness, sleepiness, and intense headaches.

Warning

Carbon monoxide gas—derived from products of combustion of motor fuel, LP gas, and other petroleum-based products—is a deadly gas which can kill motor-home occupants, if allowed to accumulate in sufficient concentration. Assure that all engine operations are not restricted—tailpipes and exhaust ports should not be blocked or restricted in any way. Additionally, any accumulation of exhaust gases outside or

underneath the motor home should be avoided as such may enter the motor home through windows or vents—be careful how and where the motor home is parked to avoid such conditions. Regularly monitor outside conditions to assure that all exhaust gases can readily be dissipated and not enter the motor home inadvertently.

Warning

Never sleep in a motor home when the engine is running—engine exhaust fumes could enter the motor home and cause disability or death. Regularly check the exhaust system to note any leakage sites and, if found, discontinue use of the motor home until they are repaired by a competent, qualified service technician. Do not attempt repairs on the exhaust system yourself and do not modify (temporarily or permanently) the exhaust system at all.

Should any of these symptoms be experienced in the motor home, one should IMMEDIATELY evacuate the motor home and seek medical help. Shut down the motor home and do not attempt to operate it again until the source(s) of the CO are located and fixed.

In the event of an alarm, the following steps should be taken quickly:

1. If the alarm signal sounds (4 beeps and flashing or solid red light), operate the Test/Mute button.

2. Immediately move to a source of fresh air, either outdoors or by an open door or window. Do a "head count" to make sure that all people (and pets!) within the motor home have moved to a source of fresh air, too. Do not reenter the motor home or move away from the source(s) of fresh air until the emergency responders have arrived, the motor-home interior is sufficiently aired out, and the alarm has reverted to its normal monitoring function (i.e., no alarms).

3. Call the local emergency services (i.e., 911 in most locales) to summon help – don't go back into the motor home to make this call, but use a cell phone, if available, or have someone else nearby make this call.

4. Should the CO/LP gas Detector Alarm again activate within a 24-hour period, repeat Steps 1 through 3 and also call a qualified service technician to investigate the possible sources of CO (e.g., fuel-burning equipment and appliances) to locate, identify, and fix such.

Chapter

5

Cabinets & Furniture

Cabinets

Your Allegro Bus contains cabinetry installed throughout the entire motor home from the driver's area (Figure 5-1), through the kitchen/dining areas, and back into the bedroom (Figure 5-2). The cabinetry has been designed and built to provide ample storage space, to be easily accessible, and to be conveniently located to support the areas of concern. Construction of these cabinets incorporates various hardwoods, raised panels, cabinet doors, and supports. Door pulls, handles, and knobs are installed in a style complementing the particular décor of each Allegro Bus so that an aesthetically-pleasing, and fully functional, storage capacity is realized.

Figure 5-1. Bathroom & Bedroom Cabinetry

For the many floor plans available in the Allegro Bus product line, cabinet design has been optimized to provide maximal storage for each and every floor plan available. Accordingly, the Allegro Bus can readily accommodate the routine materials, supplies, and customer-specific items desired for any travel requirements.

Further, these cabinets are designed to contain stored supplies quite securely during travel to minimize or eliminate the possibility of shifting or spilling of cabinet contents during travel. Yet, when the motor home is parked, all stored items are readily available in the cabinets for the convenience of the users.

Figure 5-2. Kitchen Cabinetry

As the storage requirements will vary somewhat from one floor plan to another, general observations can be made about the Tiffin-supplied cabinetry which may or may not be applicable for your specific Allegro Bus configuration.

Cabinets (Figure 5-2) are provided in the kitchen/dining area to accommodate the routine cooking utensils and groceries normally desired for travel. Storage space within these cabinets has been well designed to accommodate the typical sizes and configurations of food supplies (e.g., cereal boxes, condiments, canned goods, bottled liquids) normally taken on travel trips.

Based on Tiffin Motorhomes' extensive experience with travel requirements of the seasoned motor-home users and from Tiffin Motorhomes' own research and development in cabinet-design requirements, the resultant cabinets offer the greatest storage capacity possible.

In the bathroom and bedroom, additional cabinets are available for storage of sundries and toiletries specific to these areas.

In the kitchen, a color-coordinated countertop is provided on top of the floor-mounted cabinets. To maintain the appearance of the countertop (Figure 5-3), clean with a damp cloth. If spotting occurs, clean the countertop with a damp cloth and a mild liquid soap. Should some dried-on residue still persist, let a damp cloth moistened with the liquid cleaner stand directly on top of that residue for 15-30 minutes to loosen the

residue, then clean that spot accordingly. Please note that strong chemicals, solvents, and cleaners (e.g., oven cleaner) may damage the surface; so do not use any products not specifically designed for countertop cleaning.

The countertop may be physically damaged, too, if proper care is not taken. Do not cut anything (e.g., vegetables, fruits) directly on the countertop; rather, use a cutting board on top of the countertop to provide necessary protection to the countertop. Excessive heat may also damage the countertop; therefore, any pots or pans taken directly from the range or oven should not be placed directly on the countertop; rather, use trivets or some other form of fireproof heat insulators to hold very hot pots or pans on the countertop.

Figure 5-3. Kitchen Countertops

All drawers are equipped with metal slides to provide additional load-bearing strength for the drawers and to permit effortless opening and closing of those drawers, even when they are fully loaded. These metal guides have a slight "locking" action, when closed. To open those drawers, slightly lift up on the drawer handle and then pull the drawer open. To close, push the drawer closed until it "clicks" back into place (i.e., the locking action is engaged).

As this cabinetry is typically of furniture-grade quality, any commercial furniture polish or cleaner can be used. Do not try to soak these wooden surfaces with any water or any other liquid; be sure to wipe up spills or residues of any fluids that contact these surfaces to preclude any staining or discoloration of the cabinet surfaces.

Furniture

Kitchen, Dining, & Living Room Areas

On all the various floor plans of the Allegro Bus, a built-in dinette booth (Figure 5-4) is standard; a free-standing table (Figure 5-5) is optional. This dinette provides additional storage under the seat area of the booth, in addition to providing additional sleeping facilities. The sleeping area is realized by lowering the dinette-table top and rearranging the seating cushions. Specific directions for converting the booth dinette into a bed are as follows:

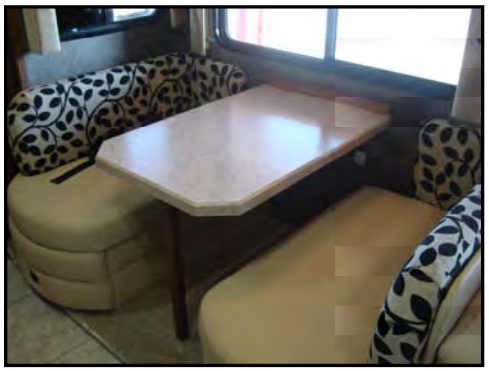


Figure 5-4. Dinette Booth

1. Remove seat back cushions.
2. Slide seat bottoms back.
3. Fold the table leg upwards, while slightly lifting the table, allow the table to swing down and rest between the two booth seats; thus, forming the bed (Figure 5-6).
4. Reinstall the seat back cushions and back rests to make up the mattress for the bed.

The living room contains a standard sofa (Figure 5-7) which converts into a bed as required. It may be one of two styles—either a jack knife bed or an optional air coil hide-a-bed sofa sleeper. The optional air coil hide-a-bed sofa sleeper includes an air pump. It operates by depressing the black latch and unfolding the bed. The sofa is custom coordinated with the décor of the motor home. To convert the sofa into a bed, follow these directions:

Figure 5-5. Dining Table and Chairs

Figure 5-6. Dinette Converted into Bed

1. Remove the accent pillows.

2. Under one of the seat cushions locate the "black tab" and slide the tab to the left or the right and then pull upwards on the seat portion of the sofa—this will cause the sofa seat to open, extend, and convert into a bed.

Figure 5-7. Sofa Bed in Closed Position

There may also be a swivel rocker/recliner with adjustable headrest; it is also coordinated with the décor of the motor home.

Figure 5-8. Captain's Chair

The driver's seat (Figure 5-8) is an electric-powered, six-way power seat (i.e., movement: up, down, forward tilt, reverse tilt) having swivel features (and recline features for the passenger seat only). When the motor home is parked, the driver's seat can be swiveled to face into the living room.

To swivel this chair, first extend the slide-out room (see Chapter 8 for additional detail). Then move the chair backwards as far as possible to gain clearance from the steering wheel. Now the chair can be swiveled without interference. The control switch for the driver's chair is located on the left-hand side in front of the power base controls. In a comparable manner, the passenger's seat is also an electric-powered, six-way seat having essentially the same controls as that of the driver's seat and it is operated accordingly.

Bedroom Area

If a décor-coordinated, quilted bedspread with accessorized pillow shams and accent pillow(s) are included (Figure 5-9) with the bedroom suite, it is recommended that the bedspread be dry-cleaned only to

Figure 5-9. Bedroom Decor

preserve the quality and integrity of the bedspread for the longest time possible.

Treatment of the bedspread with any of the stain-resistant sprays (e.g., Scotchgard or its equivalent) will also make the bedspread more resistant to the possibilities of stains and fabric damage.

If maintained properly, the bedroom soft-goods accessories will provide years of dependable service and maintain the desired décor established by the motor-home owner.

Chapter

6

Structural Features

Chassis Features

The chassis (Figure 6-1) of your Tiffin Motorhomes Allegro Bus will be built by and is warranted by either Freightliner or Powerglide. The operating instructions for your specific chassis are included in the Chassis Owner's Manual which is provided with your Allegro Bus and is a part of the Owner's Information Package furnished to you by your Tiffin Motorhomes Dealership.

Figure 6-1. Freightliner Chassis

Before you begin using your Allegro Bus, please read and follow all recommendations for the proper care, operation, and maintenance of the chassis—this will assure you of pleasant, trouble-free use of your motor home.

Should you have any questions about the chassis, however, you should contact your chassis manufacturer as noted in the literature described earlier.

TYPICAL CHASSIS ITEMS COVERED UNDER WARRANTY BY THE CHASSIS MANUFACTURER
Steering Wheel
Steering System
Instrument Panel
Engine
Transmission
Chassis Frame
Axles
Fuel Tank
Suspension and Springs (Front-End Alignment is not covered)
Tires and Wheels
Brakes
Exhaust System
Leaf Springs

Alignment

The Allegro Bus motor home you have purchased has been aligned at the factory prior to shipment to you. During the first 10,000 miles of operation of your Allegro Bus, the chassis will have a tendency to "settle" and readjust itself in response to the loading of your motor home.

Although it normally is not necessary to realign the Allegro Bus before the first 10,000 miles of use; it is, nonetheless, recommended that you have the Allegro Bus alignment checked after the first loading of the motor home. However, if you feel that you have noted some discrepancy or anomaly in steering operation, please contact your chassis manufacturer or call Tiffin Customer Service at (256) 356-0261 to address your concerns.

Chapter

7

Electrical Features

General Information

There are two electrical systems in your Allegro Bus motor home—these are the 12-volt DC (12 VDC) system and the 120-volt AC (120 VAC) system. Most standard appliances require the 120 VAC system, while the majority of the lighting systems used in the Allegro Bus use the 12 VDC system.

The electrical power for the 12 VDC system is supplied by the batteries of the Allegro Bus; those batteries are, in turn, charged by a power converter. The electrical power for the 120 VAC is supplied either by the electrical power hookup cord when the Allegro Bus is connected to an external power source or when the on-board electrical generator is in operation.

If installed, the optional inverter can also supply 120 VAC electrical power (to limited outlets and limited appliances)—the inverter transforms the 12 VDC electrical power from the batteries into the 120 VAC electrical power for the basic appliances.

Caution

Failure to turn off the 120 VAC appliances when starting or stopping the generator may damage the transfer switch and/or electrical appliances.

To connect the Allegro Bus to an external source of 120 VAC electrical power, it is first recommended that all of the circuit breakers are in the "off" position—this is done to prevent any power surge upon connecting the motor home to the external power source.

Then unwind the power cord from the electrical compartment located in the compartment behind the driver's-side rear tires. The standard, flexible, power cord supplied with the Allegro Bus is designed to handle up to 50 amperes.

Make sure that the pins in the male end of the plug are oriented correctly so that they match the power cable and that they are in good condition (i.e., aren't bent or damaged). If there is a circuit breaker switch at the "plug" end of the power cord, that breaker should be turned "off" before making the connection. Insert the plug into the mating outlet and then turn the circuit breaker "on."

Close and lock the electrical compartment door to protect the contents and to keep them clean and dry. Close the cover on the power box, if so equipped, to avoid an unintentional disconnection and to keep the contents clean and dry. Then switch the main breaker to the "on" position.

When properly connected, the 120 VAC system provides power to all the 120 VAC circuits and outlets when the main breaker is turned "on."

Circuit-Breaker Boxes

For the Allegro Bus, the 120 VAC breaker box and a separate 12 VDC breaker box (Figure 7-1) are typically located beneath the refrigerator or in the bedroom [*if inside the vehicle*]. The circuit breakers and associated fuses are installed to protect the electrical system of the Allegro Bus from any overloads. Do not attempt to change the electrical circuitry or to add appliances yourself.

Figure 7-1. Circuit Breaker Box

Please consult an authorized Tiffin Motorhomes Dealership or Tiffin Motorhomes, Incorporated in Red Bay, AL to determine whether any changes you desire are appropriate and acceptable. Tiffin Motorhomes' qualified staff of electricians can readily determine whether any changes sought (e.g., CB radio, amateur radio, personal computer system, and the like) are possible or not and can advise you on how best to realize these enhancements. Please note that the 12VDC fuses are located in the same compartment in the same distribution bay as the 120 VAC breakers. Fusing is provided for the following 12 VDC circuits: All interior decorative and overhead lighting, water heater, TV switching box, slide-out lights, power roof vents, monitor panel, and the passenger-side console switch panel.

Figure 7-2. 12 VDC Fuse Panels

Additional 12 VDC fuse panels (Figure 7-2) are located in the front storage compartment on the driver's side; these fuse panels provide protection for the following circuits: Mirrors, fog lights, hydraulic jacks, camera, wipers, docking lights, dashboard panels, spot light, power seats, radio, step cover, satellite receiver, 30-ampere ignition breaker, 50-ampere ignition breaker, and dashboard air circuit breaker. These fuse panels are protected by a plexiglass shield to prevent accidental short-circuiting of the 12 VDC power system. To protect this 12 VDC system further, **DO NOT STORE anything** in this compartment (e.g., toolbox) which may jostle around, break through the shield, and short out the 12 VDC system—if this system were short-circuited, extensive damage and/or fire could result. Located on the passenger-side rear compartment is another circuit panel which contains the following circuit breakers: Slide-outs, 12 VDC disconnect, storage box lights, and solenoids.

Warning

When any fuse is to be replaced, never replace a blown fuse with another fuse with a larger current rating (e.g., amperes) than the original rating of the fuse being replaced—to do so would probably damage circuits and/or equipment and cause harm, injury, or death to nearby persons.

Auxiliary Start Switch

The auxiliary start switch (Figure 7-3) is located on the driver's-side console box (Figure 7-4). This switch briefly connects the Allegro Bus coach batteries to the chassis batteries which, in turn, allows the chassis batteries to "borrow" power from the coach batteries to assist in starting the engine.

Figure 7-3. Auxiliary Start Switch (Center)

If the chassis batteries cannot themselves start the engine in the "normal" mode, hold down the battery-boost switch and retry starting the engine.

By using the battery-boost switch while trying to start the Allegro Bus engine, a jump-start situation is realized between the coach and chassis batteries.

Figure 7-4. Driver's Side

If the battery-boost switch is required to start the engine on a reguar basis, ask your Tiffin Motorhomes Dealership to check the chassis batteries and the associated charging system.

If your motor home features an all electric residential refrigerator; it will be equipped with six 12-volt house batteries.

Battery Inspection and Care

The 12-VDC electrical-power system consists of six 20 amp hour VDC batteries wired in a series-parallel combination to provide a final, 12 VDC system providing up to 450 Ampere-hours (A-hr) of service.

As the batteries contain a significant, and potentially lethal, amount of electrical energy; they must be handled with due diligence and care. Some of the routine precautions include:

Warning

Remove rings, metal watchbands, and any other metal jewelry before working around batteries. If any metallic object (tool, jewelry, etc.) contacts the positive battery terminal or any connection made to that terminal AND also contacts the negative terminal or any of its connections, a SEVERE ELECTRICAL SHORT will occur which could result in an explosion, fire, and/or personal injury. Lead-acid batteries contain diluted sulfuric acid which can be dangerous; avoid direct contact with any battery fluids. Always wear eye protection while servicing batteries.

Caution

Disconnect the 120 VAC electrical power cord and the negative terminal from the coach batteries BEFORE working on the Allegro Bus electrical system.

Caution

If the Allegro Bus ever requires any welding operations on the frame, first disconnect the chassis batteries. Failure to do so will destroy all of the chassis computer system.

When batteries (Figure 7-5) are not used for extended periods of time, they will gradually lose their electrical charge. Therefore, it is necessary periodically to recharge the batteries to increase the operational lives of the batteries. It is also necessary to check the external condition of the batteries on a regular basis. Look for cracks in the battery case and cover. Check the vent plugs and replace them if they are cracked or broken. Keep the battery clean.

Figure 7-5. 12 VDC Battery Supply (Compartment)

Since accumulations of dirt and acid residue around the battery terminals may provide an electrical path for discharging the battery, the area around the terminals should be cleaned periodically. One can use an old toothbrush and a sparse amount of a diluted solution of baking soda (sodium bicarbonate) and water (distilled or de-ionized, preferred; tap water, acceptable) to clean and neutralize any acidic build-up around the battery terminals.

If there is any foaming on the top of the battery, this indicates that acidic residues are being neutralized. Rinse the cleaned areas thoroughly with distilled or de-ionized water (tap water is also acceptable).

Avoid getting the baking-soda solution into the battery fill plugs to each battery cell; this would drastically reduce the effectiveness of the battery (by neutralizing the sulfuric acid in the battery cells) or, worse, "kill" the battery. Dry the battery cables and terminals to prevent corrosion; to protect those terminals further, use a plastic ignition spray on the terminals. Do not use grease on the terminals, especially on the metal-to-metal connections, as grease may act as an insulator and keep the battery electrical power from entering the cables.

If the batteries are not going to be used for an extended period of time, they should be removed from the Allegro Bus and stored in a warm, dry place. IT IS STRONGLY RECOMMENDED that this service be

performed by a qualified service technician, as the process is usually too complicated for the average owner to perform.

For those who may wish to perform this service themselves, the following procedure is described: Mark the battery cables ("**+**" [plus] sign or "red" for the positive cable; "**-**" [minus] sign or "black" for the negative cable) so that they can be properly reconnected again later. Then disconnect the negative terminal(s) from the batteries. Afterwards, disconnect the positive terminals. Now the batteries can be removed for storage. When the batteries are moved, keep them upright at all times. To reinstall the batteries at a later date, reverse the above-described process. While in storage, these batteries would require periodic recharging to maintain their full charge.

Figure 7-6. Battery Slide Tray

Additionally, the batteries will, over time, lose some of the water used with the sulfuric acid in the batteries. Following manufacturer's recommendations as found in the Owner's Information Package, periodically check the fluid levels in all the cells of the batteries (be sure to use safety eyewear during this process) and fill those that are low with water (distilled or de-ionized water is preferred; tap water is also acceptable).

Don't overfill the cells; follow the filling directions exactly. This battery checkup should be done on a regular basis to realize the fullest service possible from the batteries over the longest time possible.

The batteries are installed on a sliding tray (Figure 7-6) which allows you to extend out of the compartment to check battery and water levels. Located inside the compartment is a handle (Figure 7-7) that must be pulled in order to release the slide tray.

Figure 7-7. Release Handle for Slide Tray

NOTE: Your Allegro Bus may be equipped with maintenance free glass matte batteries. If so, these batteries **WILL NOT** be installed on a sliding tray.

If the Allegro Bus is to be stored for an extended period of time, the 12 VDC battery system should be disconnected—this will prevent unnecessary drain and corrosion of the batteries and their terminals.

CAUTION

NEVER ALLOW BATTERIES TO FREEZE! When not using the motor home, keep the batteries charged. Fully charged batteries will not freeze.

Allowing the batteries to freeze will void the battery warranty.

Battery Disconnect Panel

The battery disconnect panel is located inside the battery storage compartment. There is a rotary switch (Figure 7-8) on the upper left-hand side of the compartment which can disconnect the engine battery when the vehicle is to be stored for any appreciable time. Rotating this switch disconnects the engine batteries only, not the house batteries. This feature is designed to prevent the engine batteries from being drained during storage. This switch also disconnects all the 12 VDC circuitry from the batteries; thus removing the total electrical load from those batteries. On the upper, right-hand side of that compartment is another rotary switch (Figure 7-9) which, when activated, disconnects the "house" batteries (i.e., the 12 VDC system for the motor home). When the Allegro Bus is to be stored for any length of time, it is wise to disconnect these two 12 VDC systems.

Figure 7-8. Rotary Switch to Disconnect Engine Battery

Figure 7-9. Rotary Switch to Disconnect "House" Batteries

When the Allegro Bus is removed from storage, rotate the upper, left-hand switch to reconnect the 12 VDC circuitry to the coach batteries again and rotate the upper, right-hand switch to reconnect the "house" battery—the 12 VDC systems are now reactivated. The Freightliner or Spartan chassis of the Allegro Bus may be equipped with a second disconnect switch strictly for the chassis batteries.

If your Allegro Bus is so equipped, this "master kill switch" may be located in the rear engine compartment. This switch disconnects all power to the coach so that the coach cannot be started. This switch is used to prevent the ignition circuitry from being accidentally turned on when the engine is being serviced.

For routine, short-term use, there is a "12 VDC disconnect" switch (Figure 7-10) on the switch console located in the stairwell of the Allegro Bus. This switch—located in the upper, left-hand corner of the switch console—can be used to disconnect the "house" battery from most of the 12 VDC circuits in the motor home so that there is no inadvertent drain on the battery while the owner is away from the motor home (e.g., shopping trips, day trips for sightseeing).

Figure 7-10. 12 VDC Disconnect Switch

It is a good idea to develop the habit of disconnecting the 12 VDC "house" battery system whenever one leaves the motor home for the better part of a day so that the "house" battery is protected. Additionally, it is worthwhile periodically to check the fluid levels in the batteries constituting the 12

VDC "house" battery system to make sure that all fluid levels are properly maintained; otherwise, a full charge cannot be maintained in the batteries.

Your motor home is also equipped with a float charger. This charger is automatically activated when the motor home is plugged into shore power in order to maintain the cranking batteries.

120-Volt AC (120 VAC) Receptacles

Your Allegro Bus Motor Home is equipped with several 120 VAC receptacles (Figure 7-11) located throughout the interior of the motor home. These 120 VAC receptacles are of the "three-prong" variety; the third prong being a grounding pin which provides adequate grounding to protect one from any electrical shock.

Figure 7-11. 120 VAC Outlets

For these receptacles to work properly, do not use an adapter, cheater, or extension cord which defeats the function of the grounding pin. For the same reason, never remove or bend away the ground prong or pin from any three-prong AC plug so that it would fit a two-prong AC receptacle (i.e., an ungrounded AC receptacle).

Never operate the Allegro Bus if there is an electrical short present, as an electrical short may deliver an electrical shock to anyone coming in contact with the exterior of the unit. If you should feel even the slightest of electrical shock, immediately disconnect the unit from the 120 VAC power source and locate the electrical fault (i.e., typically, it is a break in the grounding circuit).

Do not reconnect the 120 VAC power until after that electrical fault is fixed—the grounding circuit must be continuous from the frame to the distribution panel, to the power cord, and to the earth ground so that electrical-shock protection is realized.

12-Volt DC (12 VDC) Receptacles

Your Allegro Bus Motor Home is equipped with a 12 VDC receptacle conveniently located on the dashboard or bulkhead. This 12 VDC receptacle can be used for providing power to various items, such as cellular phones or personal computers or portable communications equipment.

Figure 7-12. 12 VDC Outlet

This receptacle is usually found on the bulkhead or on the dashboard (i.e., the connector in Figure 7-12) in front of the passenger's seat so that it is conveniently available to be used by the personnel in the cockpit area.

Multiplex System

Your motor home features a 12 VDC multiplex system (Figure 7-13). This system allows the ability to control circuits from multiple locations in the coach. Each switch allows you to turn a circuit on or off with individual button presses and provides an indicator light to tell you the status of the circuit (i.e. whether it is on or off). Many of the circuits are also dimmable by simply holding the button to dim up or down.

Figure 7-13. Multiplex System

Additional features of the multiplex system include the following:

- Master Feature (***this is only on the control panel located at the entrance door***)—this allows you to turn all lighting circuits on or off with the press of a single button that is labeled "Light Master." Pressing the Light Master "off" switch will turn off all the interior lights within the coach. Momentarily pressing the Light Master "on" switch will turn on the same circuits that were on when Light Master "off" was pressed. Light Master "off" remembers which lights were on when the switch was pressed and will turn those same lights back on when the Light Master "on" is momentarily pressed. Holding the Light Master "on" switch will turn on all interior light circuits.

- Switch Panel Back Lighting—all of the switches are backlit to make the labels easy to read. If you desire to turn the panel lights off, a switch is conveniently located at the center of the coach labeled "Panel Lights" which allows you to turn the back lighting On, Off, or Dim.

- Status LED Indicator—a green LED beside each switch indicates whether the load is on or off. In some cases, certain switches such as Awnings, Compartment Locks, and Generator do not have a status indicator at the switch.

- Dimming Circuits—certain circuits within the coach are dimmable. To dim a light down, simply hold the "off" switch until the light is at the desired level and release the switch. This setting will be remembered the next time the circuit is turned on. To adjust the light up, simply hold the "on" switch until the light is at the desired level and release the switch.

- Timed Cargo Light Feature—when the cargo lights are turned "on," they will automatically turn off within 14 minutes to prevent battery run down.

In the event that you have to check fuses, the centralized control panel is located in the third passenger side bay. The fuses for the different light circuits are located here. The status of a fuse for any circuit can be easily identified by looking at the circuit number and coordinating the number to the proper listing on the fuse list chart beside the centralized control panel.

If a circuit is on and the fuse is blown, the indicator light beside that fuse will be red. If the circuit is on and the fuse is good, the indicator light beside that fuse will be green. If the circuit is off, the indicator light beside that fuse will not be on.

Ground-Fault-Circuit-Interrupt (GFCI) Receptacles

In the kitchen and bath areas, there are 120 VAC GFCI receptacles (Figure 7-14) which provide greater protection against inadvertent electrical shocks. These specialized GFCI receptacles provide both overload and short-circuit protection for the user. The electrical receptacles located in the slide-out(s) are wired through the kitchen GFCI. The exterior receptacles are wired through the bathroom GFCI. Consequently, if an appliance plugged into a slide-out or exterior receptacle is not working, check for a tripped GFCI in the kitchen or bathroom.

Figure 7-14. Ground-Fault Circuit Interrupter (GFCI)

In addition, these receptacles protect the user from ground faults between an electrically "hot" wire and ground. The GFCI will not reduce the shock hazard if the short is between a neutral and "hot" wire or two "hot-lead" wires.

The GFCI should be tested at least once a month. The 120 VAC electrical system must be "on" for the GFCI to be tested. To test the GFCI the reset button needs to be pushed in fully before starting the test. Push the test button; this will cause the reset button to pop out which means that the protected circuits have been disconnected. Push the reset button back in until a "click" is heard—this will reactivate the protected circuit. If the GFCI is working properly, the reset button will remain in the "in" position.

Inverter / Converter

Your motor home is equipped with a 2800 or 2000 watt Sine Wave Inverter. When the 120 VAC power is not available, either from the power cord or the generator, the optional inverter/charger (Figure 7-15) may be used. The control panel for the inverter/charger is located above or near the entrance door.

Figure 7-15. Sine Wave Inverter

The inverter/charger has two modes of operation: INVERTER (providing power to your appliances from the batteries) and AC (running from shore power or a generator). Whenever the inverter is in AC mode, it passes power directly to your appliances as well as recharges the batteries using a 3-stage battery charger (Bulk, Absorption and Float). This approach to battery charging provides rapid and complete chagrining cycles without placing undue stress on the batteries. Inverter operation is fully automatic.

With search mode enabled, the inverter pulses the AC output looking for an electrical appliance (typically 5 to 100 watts, depending upon the setting you've selected). Whenever there is no load detected, the inverter automatically goes into search mode (sleep) to minimize energy consumption. During this time, the inverter's green LED flashes (fast) to indicate SEARCH mode. When an appliance is switched on inside the coach, the inverter recognizes the need for power and automatically starts the inverter.

Whenever AC Shore Power is no longer sensed, the inverter automatically transfers to battery power with no interruption to your appliances. The inverter's green LED flashes once every 2 seconds (medium flash) to indicate it is running on battery power and providing AC to the coach.

Whenever AC Shore Power is sensed, the inverter automatically transfers to the shore power with minimal interruption to your appliances.

Whenever the inverter is running on nominal AC Shore Power, it charges the batteries. The inverter's green LED stays ON (solid) to indicate the first stage of charging. During bulk charging, the charger supplies the maximum amount of constant current to the batteries. As the battery voltage rises to a set value, the charger will then switch to the next charging mode.

As the inverter continues to run on nominal AC Shore Power, and the batteries have been successfully bulk charged, the charger enters its second stage of charging. The inverter's green LED flashes once every second (fast flash) to indicate absorption charging for 1-3 hours depending upon battery bank selection. The charger then switches to its final chagrining mode.

As AC shore power continues the inverter's green LED flashes once every 8 seconds (slow flash) to indicate the third and final stage of charging. The batteries are held at the float voltage as long as AC is present at the inverter's input. Float charging reduces battery gassing, minimizes watering requirements (for flooded batteries) and ensures the batteries are maintained at optimum capacity.

The inverter monitors the AC Shore Power, the batteries and itself. Whenever a condition occurs that is outside the normal operating parameters, the inverter will take the necessary steps to protect your appliances, batteries or itself from damage.

Whenever the battery voltage reaches a low level, the inverter will initiate Low Battery Cutoff (LBCO) which automatically shuts the inverter down, along with all connected loads, to protect the batteries from over-discharge damage. The inverter's LED turns OFF to indicate the fault condition.

As the inverter is charging, it constantly monitors the batteries. In the event the battery voltage approaches too high of level, it automatically turns off the battery charger to protect the batteries from damage. The inverter's LED turns OFF to indicate the fault condition.

NOTE: High battery voltage may be caused by excessive voltage from the alternator, solar panels, or other external charging sources.

During inverter and AC Shore Power operation, the inverter monitors the AC and DC circuits. In the event of a short-circuit or overload condition, the inverter will shut down. The inverter's LED turns OFF to indicate the fault condition. During inverter operation, if the inverter becomes overheated, it will shut down to protect itself from damage. The inverter's LED turns OFF to indicate the fault condition.

For further reading and additional information on the above, please reference your inverter/charger manual that will be found in your Owner's Information Package.

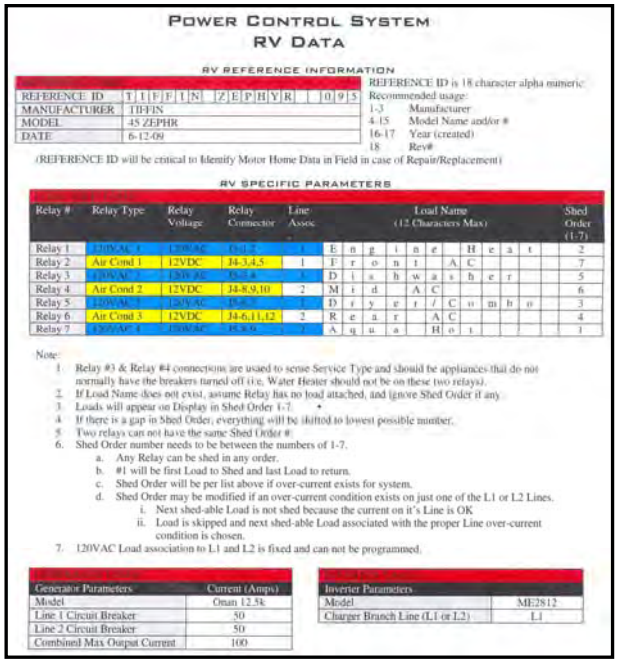
Energy Management System

The energy management system (EMS) (Figure 7-16) distributes all the 120VAC power throughout the motor home, whether it comes from shore power, generator, or the inverter. The EMS monitors the incoming power, and manages the power to reduce circuit breaker tripping. It does this by momentarily shedding power to the loads under its control when the user turns on other more critical appliances in the motor home. EMS restores power when the appliance is turned off. The EMS panel displays the status of incoming power and the controlled loads.

Figure 7-16. Energy Management System

When coupled with an inverter, EMS reduces battery charge rate prior to shedding any loads. Working together, an inverter assist feature is available. Normally the inverter is at rest when shore power is available. EMS utilizes the inverter and the coach battery bank to smooth out peak load demands. In one sense, the inverter will temporarily provide power to some of the appliances, prior to shedding any loads.

The following lists the load shedding chart:



POWER CONTROL SYSTEM
RV DATA

RV REFERENCE INFORMATION

REFERENCE ID	TIFFIN ZEPHR 0905
MANUFACTURER	TIFFIN
MODEL	45 ZEPHR
DATE	6-12-09

REFERENCE ID is 18 character alpha numeric
Recommended usage:
1-3 Manufacturer
4-15 Model Name and/or #
16-17 Year (created)
18 Rev#

(REFERENCE ID will be critical to Identify Motor Home Data in Field in case of Repair/Replacement)

RV SPECIFIC PARAMETERS

Relay #	Relay Type	Relay Voltage	Relay Connector	Line Assoc	Load Name (12 Characters Max)	Shed Order (1-7)
Relay 1	120VAC 1	120VAC	J3-1,2	1	Engine Heater	2
Relay 2	Air Cond 1	12VDC	J4-3,4,5	1	Front AC	7
Relay 3	120VAC 2	120VAC	J3-3,4	1	Dishwasher	5
Relay 4	Air Cond 2	12VDC	J4-8,9,10	2	Mid AC	6
Relay 5	120VAC 3	120VAC	J3-5,6	1	Dryer/Washer	3
Relay 6	Air Cond 3	12VDC	J4-6,11,12	2	Rear AC	4
Relay 7	120VAC 4	120VAC	J3-7,8	1	Aqua Hot	1

Note:
1. Relay #3 & Relay #4 connections are used to sense Service Type and should be appliances that do not normally have the breakers turned off (i.e. Water Heater should not be on these two relays).
2. If Load Name does not exist, assume Relay has no load attached, and ignore Shed Order if any.
3. Loads will appear on Display in Shed Order 1-7.
4. If there is a gap in Shed Order, everything will be shifted to lowest possible number.
5. Two relays can not have the same Shed Order #.
6. Shed Order number needs to be between the numbers of 1-7.
   a. Any Relay can be shed in any order.
   b. #1 will be first Load to Shed and last Load to return.
   c. Shed Order will be per list above if over-current exists for system.
   d. Shed Order may be modified if an over-current condition exists on just one of the L1 or L2 Lines.
      i. Next shed-able Load is not shed because the current on it's Line is OK
      ii. Load is skipped and next shed-able Load associated with the proper Line over-current condition is chosen.
7. 120VAC Load association to L1 and L2 is fixed and can not be programmed.

Generator Parameters	Current (Amps)
Model	Onan 12.5k
Line 1 Circuit Breaker	50
Line 2 Circuit Breaker	50
Combined Max Output Current	100

Inverter Parameters	
Model	ME2812
Charger Branch Line (L1 or L2)	L1

Electrical Generator

The electrical generator (Figure 7-17) is located in a compartment in front of the motor home between the chassis rails on pull-out slides. The generator is mounted on slides for easy access; however, the slides must be

unlocked before free movement is possible. There is a "pull" cable (Figure 7-18) in the external compartment in front of the front tire on the driver's side—pulling this cable will release the slide lock for the generator.

Figure 7-18. "Pull" Cable for Generator Release

Prior to starting or stopping the generator, make sure that all the 120 VAC appliances are turned "off." After the generator has been started, wait until the transfer switch has connected before turning "on" any of the appliances.

Figure 7-17. Electrical Generator

The generator can be started from either the remote-start switch located on the dash or directly at the generator itself. The hour meter installed on the generator records the number of hours of operation of the generator motor—this elapsed time is needed for observing necessary maintenance schedules on the generator.

Caution

Failure to turn "off" the 120 VAC appliances when starting or stopping the generator may damage the transfer switch and/or electrical appliances.

For more detailed operating instructions of the generator and to determine necessary preventive-maintenance schedules and procedures, review the manufacturer owner's manual.

Automatic Transfer Switch

The automatic transfer box switches AC power from shore to generator to the coach main distribution panel. This is achieved by the closing and opening of contactors that are located in the box interior (see diagram on Automatic Transfer Switch which is located in owner's information package). Power from shore is fed through contacts located on R4 and R5. Power input is sensed by electrical board B1. If shoreline neutral is present it will allow relay R1 to energize which energizes relays R2 and R3 applying shore power to the main control box located in the motor home. If the unit senses that an open neutral condition exists, R1 will not energize not allowing the coach to receive the potentially appliance damaging voltage. Power from the generator is sensed by boar d B1 and after a delay of 15-20 seconds, R4 and R5 energize automatically disconnecting shore power B1 checks for generator neutral and if present allow R2 and R3 to energize allowing generator power to the main control panel.

Caution

Service to this box is to be done by a qualified technician. DO NOT attempt to remove cover unless shore cord is unplugged and generator is off.

If the unit is plugged into shore but no power to coach then make sure the shore outlet has power. If power is present this may indicate the unit is sensing an open neutral condition. Start the generator. If power is restored to the coach then neither the shore plug or outlet may be defective (the neutral line may be broken).

If there is no power to coach from shore or generator then check the generator circuit breaker. If the circuit breakers are not tripped in generator or coach, replace transfer box.

For more detailed information on the automatic transfer switch, please refer to the specific owner's instructions found in the owner's information package.

Resettable Circuit Breakers

The resettable circuit breakers (Figure 7-19) are located within 18 inches of the source of power; that is, the converter and the battery. When the circuit breakers are shut down or electrically tripped, they must be manually reset. To find the circuit breakers, follow the line from the battery or converter approximately 18 inches—this may lead to a junction box or to a cabinet inside the Allegro Bus or to a similar location.

Figure 7-19. Resettable Circuit Breakers

As needed, manually reset the circuit breaker or breakers as shown in the accompanying picture. Be careful when working around these connections as an accidental, electrical short to ground (i.e., momentarily connecting the "positive" or "hot" terminal to any part of the chassis) can be potentially hazardous and harmful.

Towards this end, don't store in this particular storage compartment anything which may move around in transit and subsequently cause any electrical short circuits or anything that is flammable.

Fuse Blocks

Some of the electrical circuitry within the motor home is protected by various fusing systems. Some of these fuse blocks are accessible in the front outside compartment. Underneath the dashboard is an enclosure which contains fuse blocks. These fuse blocks protect some of the major electrical systems of immediate concern to the driver such as the power seats (driver's and passenger's), spot light, mirrors, camera, radio, and various extra fused positions.

Should there be any electrical failure of these components or systems, the first troubleshooting procedure should be to check the fuses and have available replacements to replace any blown fuses, as may be warranted.

Also the Allegro Bus contains a computerized diagnostic center, located beneath the access panel which is under the dash attached to the steering column, for the engine of the motor home. This center permits a computer to be connected to the onboard diagnostic center monitoring many of the operating functions and parameters of the engine so that the current operating status of the engine can be determined and any anomalies or problems may be noted.

This diagnostic tool enables the motor home owner to maintain an updated status of the engine so that the overall reliability of the motor home can be maintained.

As an aid to extracting and/or installing fuses in the fuse blocks, one may wish to buy an inexpensive fuse puller at any electronics or hardware store. This tool makes the installation or removal of fuses much easier and prevents inadvertent damage to nearby fuses or the fuse block itself.

Whenever a fuse has been "blown" and is to be extracted and replaced, it is good practice to examine the wiring going to that particular fuse to see if there is any noticeable degradation (e.g., wiring insulation nicked, missing, or melted) which may indicate damage beyond the fusing proper.

Warning

Never replace a fuse with a fuse rated larger than that which originally came from the factory. To do otherwise will cause serious damage, overheating of the wiring, and possible ignition of nearby materials resulting in a fire.

Seven-Pin Towing Connector

Your Allegro Bus is equipped with a standard, 7-pin connector near the towing hitch at the rear of the motor home to supply the necessary circuitry to control a towed vehicle. The wiring of that connector is shown in Figure 7-20.

Make sure that any cable from the vehicle to be towed is wired correctly to mate properly with the connections shown in the connector. If in doubt about proper wiring, have a qualified service technician prepare and install the necessary cable to mate with the 7-pin connector on the motor home to assure proper operation subsequently when any vehicle is actually towed by the motor home.

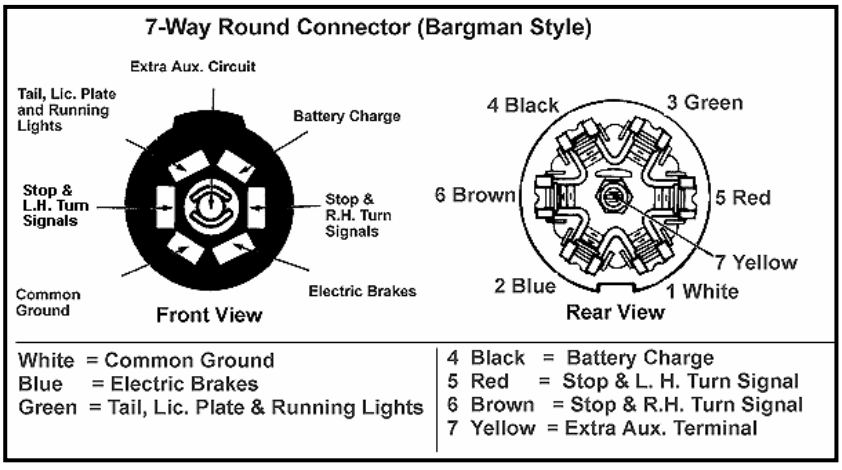


Figure 7-20. Bargman 7-Way Round Towing Connector

When the towed vehicle is uncoupled from the motor home and the cable is disconnected from the 7-pin connector, be sure to close the spring-hinged cover plate on the connector to protect the contact pins from dirt or debris. In a similar manner, protect the cable end from similar damage, weather, or debris—one such method could be to place the connector end in a heavy-gauge plastic bag (e.g., polypropylene, polyethylene, etc.) and secure the bag tightly around the cable with a stout elastic band or tape and then mount the secured cable in a manner to keep it both from mechanical damage and water intrusion.

When the towed vehicle is again coupled to the motor home via the towing hitch and the cable is again connected to the 7-pin connector, make sure the resultant connection is tight and solid so that the connection won't jar loose during use. Several supplemental methods to secure this connection have been used; some of which include securing the connection with a strong rubber band or with Velcro-type fasteners to provide a supplemental mechanical backup to the actual electromechanical connection.

Should a conversion adapter to convert the round, seven-pin connector to a flat, four-pin connector be needed; such an adapter may be purchased from any RV after-market store.

Chapter

8

Slide-Out Features

SLIDE-OUT OVERVIEW

Warning

BEFORE ACTIVATING THE SLIDE-OUT FEATURES, please read the slide-out room instruction manual first. Additionally, the motor home must be parked and the leveling jacks must be used to level the motor home PRIOR to activating the slide-out features.

General Considerations

Please Note

The Slide-Out Room requires semi-annual inspection (i.e., every six months) to assure that the slide-out mechanism is properly aligned and functioning correctly. Please make sure that this inspection is performed every six months to correct any possible misalignments.

The slide-out-room feature is actuated by means of a readily accessible, rocker switch (Figure 8-1). The rocker switch must be manually held down in the desired position (i.e., either "in" or "out") to activate the desired action of the slide-out room and continue to be held down until the desired action is concluded. **NOTE: <u>The rocker switch for the slide-out will only operate when the ignition switch is in the "on" position</u>**—there is an interlock which keeps the slide-out mechanism from operating when the ignition is "on" and the park brake is set to operate. Releasing the rocker switch before the slide-out is fully extended or retracted will stop the slide-out at some intermediate position.

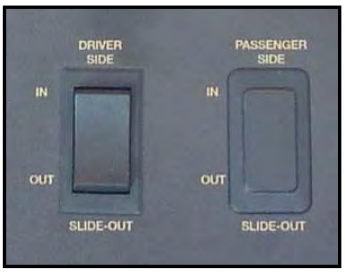


Figure 8-1. Slide-Out Switches

Operating Precautions

Warning

Before attempting any extension of the slide-out room, check outside and make sure that there is at least a five-foot clearance around the area where the slide-out room will be extended.

Before the slide-out-room mechanism is to be used, make sure that the motor home is parked, the leveling process has been properly completed. Verify that no obstacles (e.g., branches, trees, telephone poles, power/water hookups, trash bins, and the like) are within a five-foot space envelope of that slide-out room to preclude damaging the slide-out room when it is finally deployed.

Extending the Slide-Out Room

1. All windows in any slide-out room (Figure 8-2) must be closed and secured before that slide-out room is to be extended or retracted. Also any loose materials or possible obstructions should be removed from the immediate slide-out room area. Make sure the motor home has been leveled. Make sure that the battery is fully charged and connected to the electrical system.

Figure 8-2. Typical Allegro Bus Slide-Out

2. Verify that there are no obstructions outside which may interfere with the operation of the slide-out room.

3. Prior to moving the front slide-out room in either direction, make sure that the driver's chair is moved forward into the driving area as far as possible and is locked into position.

4. Make sure that the ignition switch is in the "on" position and the park brake is set to operate prior to using the slide-out function.

5. Push the "out" portion of the rocker switch; allow the slide-out room to go to its fully extended position—at this point, release the rocker switch (this locks the room into position).

Retracting the Slide-Out Room

1. Before attempting to move the motor home, any slide-out room(s) must be fully retracted.
2. Verify that the battery is fully charged and connected to the electrical system.
3. With the ignition switch in the "on" position and the park brake set to operate, push the "in" portion of the rocker switch; allow the slide-out room to go to its fully retracted position—at this point, release the rocker switch (this locks the room into position).

Please Note

If the slide-out room doesn't move when the rocker switch is depressed, check the following:

Make sure the ignition switch is turned "on."

Make sure the parking brake is engaged.

Make sure the battery is fully charged and connected.

Make sure the slide-out breakers haven't been "tripped"—these breakers are located in the passenger/rear compartment.

Chapter

9

Exterior Features

Towing Hitch

On the rear of the Allegro Bus can be found a Class 3, 10,000-pound towing hitch (Figure 9-1) capable of handling a tongue weight of 1,000 pounds. This hitch is installed for towing a passenger car to be used when the motor home is parked. The wire connector installed with this hitch is a standard, seven-pin connector. For more information on the connector, please see Chapter 7 of this Owner's Manual.

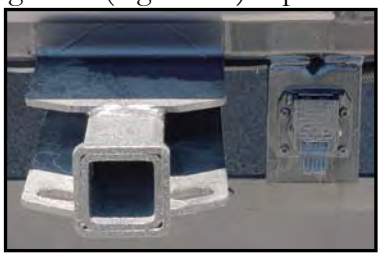


Figure 9-1. Towing Hitch

Exterior Sides

The sides of your Allegro Bus (Figure 9-2) are constructed of gel-coated fiberglass. To enhance this feature, the end caps are also gel-coated fiberglass. To clean these fiberglass surfaces, only use warm water and a mild cleanser; gently wash with soft cloths. Use of stiff bristle brushes or other harsh abrasives may cause scratches in the fiberglass surfaces. Please note: Tiffin Motorhomes is NOT responsible for the weathering/oxidation of gel-coated surfaces.

Figure 9-2. Allegro Bus Exterior

Lighted storage compartments are located on the exterior sides of your Allegro Bus. These external compartments provide ample, additional space for your belongings while you are traveling. When stowing materials in these storage compartments, try to "balance" the resultant weight load from front to rear and from side to side—this will keep the center of gravity of the motor home essentially unchanged and should not adversely affect the handling characteristics of the motor home when it is in motion.

Security Lights

On the Allegro Bus, exterior security lights (Figure 9-3) are standard features. This light is installed on the passenger side of the coach to help light that side of the Allegro Bus for added protection. This light can serve as a "porch light" when the motor home is parked and the awning is deployed so that various activities (e.g., sitting outside, grilling, visiting) at dusk and later can be enjoyed by the motor-home owners and their guests.

Figure 9-3. Security Light

Roof & Ladder

The Allegro Bus is manufactured with a fiberglass roof. Proper care and routine maintenance of your roof will assure many years of trouble-free performance. Please see Chapter 14 for details on recommended cleaning instructions. On the Allegro Bus, a roof ladder [load limit: 200 pounds] (Figure 9-4) may also be included as an additional feature.

Figure 9-4. Ladder

The ladder is typically used to permit easy access to the roof for routine maintenance and periodic inspections. The ladder comes in two sections; the upper section is attached to the motor home; while the lower section is removable and must be stored after use. When attaching the lower part of that ladder to its upper part, be sure that the ball-lock pin is securely fastened through the locking device to secure the ladder assembly.

Warning

Do not exceed the maximum rating of the ladder (i.e., 200-pound load limit).

Do not attempt to walk on the roof either while it is wet or when condensation is present from the air-conditioning system, as that surface would be quite slippery.

Leveling System (Hydraulic)

Warning

If the vehicle is equipped with a slide-out, DO NOT OPERATE any room extension until the leveling and stabilizing procedure has been properly completed. DO NOT RETRACT the leveling system until the slide-out room has been retracted. NEVER operate the leveling system when the slide-out is extended.

HYDRAULIC LEVELING SYSTEM

The Allegro Bus is equipped with hydraulic-leveling jacks. These jacks work in pairs: Front, right side, left side, and rear. **Before extending these jacks, the engine must be "off," the ignition switch must be in the "ACC" position, and the transmission must be in "park." The parking brake needs to be set and the tires blocked securely; then the leveling jacks can be activated.**

Caution

DO NOT LIFT the wheels of the motor home off the ground when leveling—if done, the motor home can tilt forwards or backwards when supported only by the leveling jacks. Never use the jacks to lift the motor home off the ground to change the tires or perform any under-chassis maintenance—these jacks are not meant for this type of

service and this misuse would be very dangerous to the operator.

HWH Leveling Control Panel

The HWH Computerized Leveling system (Figure 9-5) requires minimal effort from the motor-home user. For leveling of the motor home, perform the following steps:

Figure 9-5. HWH Computerized Leveling System

Manual Leveling (Standard):

1. Turn the ignition switch to the "acc" or "on" position. The engine must be "off" to level the coach. The transmission shift must be in position for parking. The park brake must be set either manually or automatically. If the "not in park/brake" light is "on," check or recheck the shift and brake position.

2. Press the "hyd" button. The "hydraulic operation" indicator light will turn "on" with a steady glow.

3. On the right-hand portion of the HWH Leveling Control touch panel, note the outline of the motor home and the various "raise" (i.e., "up" arrow and "lower" (i.e., "down" arrow) touch buttons.

4. Press the respective "raise" ("up" arrow) button to raise the respective side or end of the motor home. A yellow light to the front, side, or rear of the motor-home outline indicates that that side or end is low. The "lower" ("down" arrow) buttons will lower the motor home.

Automatic Leveling

1. Turn the ignition switch to the "acc" or "on" position. The engine must be "off" to level the coach. The transmission shift must be in position for parking. The park brake must be set either manually or automatically. If the "not in park/brake" light is "on," check or recheck the shift and brake position.

2. Press the "hyd" button once—the motor home will automatically level itself.

NOTE: The hydraulic jacks will always work in pairs: Front end, right side, left side, or rear end. During transit of the motor home, the "Store" position on the HWH Leveling Console must be engaged.

Electric Steps

The Allegro Bus is equipped with electric, two-step, doorsteps (Figure 9-6). The rocker switch to operate these steps is located in the passenger console box. When the power switch for the steps is in the "on" position, simply open the door and the steps will automatically extend. Detailed operation for the electrical, three-step, doorsteps is as follows:

1. Turn the step power switch "on."

2. Close the door. The step should retract and lock into the UP position.

3. Open the door. The step should extend and lock into the DOWN position.

4. Turn the step power switch "off." The step should remain in an extended position when the door is closed. Turning "off" the power with the step retracted will hold the step in a retracted position, as well.

Figure 9-6. Entrance Step Switch

5. With the step extended, turn the step power switch "off" and close the entrance door. Turn the vehicle ignition switch "on." The ignition override system will go into effect and the step will automatically retract.

Caution

If the motor home is driven with the step in the extended position, there is the possibility of causing major damage to both the step and the motor home.

6. With the step switch in the "on" position, turn the vehicle ignition switch "off" and open the door. The step will extend and lock in the DOWN position.

Caution

If the door is opened and closed without allowing the step to extend fully and lock in the "DOWN" position, the step will retract and lock in the "UP" position. When the door is re-opened, the step will not extend. The power switch must be turned "on" for the step to extend.

7. This feature is only operative the first time the door is opened after the vehicle ignition switch is turned "off." When the ignition switch is "on," the step will always activate with the door movement, regardless of the position of the step power switch.

Caution

Always be sure to "look before you leap"! When opening the entrance door from the inside, be sure that the step has fully deployed before trying to step outside to avoid falling and possible injury.

When the electric steps are fully retracted and the motor home is being made ready for travel, be sure to deploy the cover over the stairwell (use either the switch [Figure 9-7] on the driver's console or the switch on the passenger's side) to protect any occupants of the cabin from any accidental stepping into the open stairwell. Activating either switch will cause the stairwell cover (Figure 9-8) to be pneumatically deployed from a recess beneath the floor in front of the passenger's seat. This precaution will provide a safe traveling environment for anyone using the passenger's seat during travel.

Figure 9-7. Entrance Step Switch

Figure 9-8. Stairwell

Mirrors

This motor home is equipped with convex, remote-controlled, exterior, rear-view mirrors (Figure 9-9). Always adjust the mirrors for maximum rear visibility prior to driving. If another driver is to drive, be sure the mirrors are readjusted to accommodate the second driver.

Figure 9-9. Rear-View Mirror

These standard chrome mirrors are adjusted by using the multi-directional switch located on the dashboard. Select the mirror to be adjusted by pointing the arrow in the direction of that mirror. Move the control in the direction of movement desired to obtain the best view for that mirror. The adjustment control moves the top half of both mirrors. The bottom half of each mirror is convex and is adjusted manually.

Detailed instructions for these manual adjustments can be found in the manufacturer's literature available in the Owner's Information Package. However, this brief overview of mirror adjustment can begin the process: The top portion of the mirror should be adjusted horizontally so that you can see your own motor home in the one-inch surface closest to the motor home; the remaining portion of the mirror now permits you to see the road behind you. The mirror should be adjusted vertically so that you can see the rear bumper on the bottom of the plane portion of the mirror.

The convex mirrors should be adjusted horizontally so that you can see your own motor home in 1/3 of the mirror. These convex mirrors should then be adjusted vertically to allow you to see any other vehicles alongside your motor home.

These mirrors also contain heating elements to defog or de-ice the mirror glass during cold weather operation. The "on/off" switch for this feature is located by the adjustment control. Further adjustment of the mirror may be necessary at the swivel portion of the mirror arm.

Important

Objects viewed in convex mirrors appear smaller and farther away than they actually are.

Chapter

10

Interior Features

Bedspread

As a furnished part of the bedroom suite (Figure 10-1), a bedspread and matching pillow accessories are included with the Allegro Bus motor home. Other bed linens (e.g., sheets, blankets, pillows, pillowcases) are the sole responsibility of the motor-home owner and are to be provided by that owner.

Figure 10-1. Bedroom Decor

For the bedspread and pillow shams, cleaning instructions are "for dry-cleaning only," as the bedspread was made with materials treated for stain resistance; dry-cleaning will prolong the life of these materials.

Minimizing exposure to unnecessary sunlight will prolong and preserve the richness of the colors of the fabrics; so it is advisable to keep the shades closed on the "sunny side" of the motor home, whether parked or in transit.

Flooring

The living room and bedroom floor areas (Figure 10-2) are carpeted with filament-nylon carpeting treated with Scotch-guard, a stain-resistant coating. In the Owner's Information Package, there is additional literature from the manufacturer concerning the specifics of caring for the carpeting which, if followed, will prolong the appearance and life of the carpeting. Please become familiar with the recommended care and cleaning of the carpeting to assure its prolonged life.

Figure 10-2. Ceramic Tile Flooring

Ceramic tile flooring is standard in the kitchen and bathroom areas of the motor home. For routine cleaning, sweeping or vacuuming the floor would be sufficient.

If more thorough cleaning is warranted, the flooring can be cleaned with a damp mop and water. For more stubborn stains, a mixture of soap-free household cleaner (e.g., vinegar, ammonia, or comparable products) and water can be used to advantage.

One should not unduly saturate the floor surfaces with water, as this could damage the flooring substrate. Feel free to use any abrasives (cleansers, scouring pads; and the like) as they cannot scratch or mar the flooring surfaces and won't cause any damage to the flooring.

Ceiling

The ceiling (Figure 10-3) in the Allegro Bus motor home is covered with a padded-vinyl headliner which can be easily cleaned with a damp, soft cloth and a mild detergent. Take care to clean around any vent areas to prevent any buildup of dirt, grease, or other accumulations.

When cleaning around any alarms (e.g., fire alarm, CO/LP detector, and the like), take care not to introduce any water or dirt into the sensors of those alarms.

Figure 10-3. Padded-Vinyl Ceiling

Ceiling Fan

The ceiling fan (Figure 10-4) operates on 12V power and features a two-speed fan (low and high). There is a switch on the fan itself to allow for the desired rotation, clockwise or counterclockwise. To change rotation, be sure the main fan switch is in the "off" position.

Safe

The Allegro Bus may contain an optional safe (Figure 10-5). This safe can be used to hold valuables, important documents, and other items you may want to protect during your travels. The optional safe is located in the closet that is in the rear bathroom.

Figure 10-5. Safe

Window Treatments

Throughout the Allegro Bus, the window treatments consist of two shades—solar and blackout (Figures 10-6,7). The solar shade allows one to see out during the daytime yet blocks most of the sunlight and heat from entering the motor home. The blackout shade creates complete privacy for nighttime.

Each shade is installed on a manual roller tube with a retention spring. **CAUTION:** DO NOT over extend the shade—over extension will damage the roller tube.

Your motor home may be equipped with optional power shades in the living room and cockpit. Please note that this does exclude the kitchen sink window, water closet window, and bedroom.

Figure 10-5. Black Out Shade

If your motor home is equipped with optional cockpit and living area shades, the cockpit controls will be located adjacent to the driver and passenger seats.

To operate the shade(s), pull the chain down slowly to the desired level and slowly release to lock the shade in place. To retract, gently pull down on the chain and quickly release.

To clean the shades, use mild soap and water.

Figure 10-6. Solar Shade

Chapter

11

Plumbing & Bath Fixtures

FRESHWATER SYSTEM

Monitor Panel

The monitor panel (Figure 11-1) permits checking the approximate levels in the fresh, gray, and black water holding tanks; the LP-gas level; and the condition of the [illegible] panel is generally located in an overhead cabinet above the passenger's

Figure 11-1. Monitor Panel

To use this monitor, press the desired button and the panel will illuminate with the percentage of contents inside individual tanks.

The battery indicator button will display the voltage output available in the house batteries. If your motor home is equipped with the option for All Electric coach, the LPG indicator will always read "open."

Kitchen Sink

The kitchen sink (Figure 11-2) installed is a double-bowl, stainless-steel sink equipped with two sink covers to provide additional counter space when the sink is not in use.

Figure 11-2. Kitchen Sink & Counter

For the sink, cleaning care consists of washing only with mild detergents and water and using a soft cloth for subsequent drying and polishing. The faucet in the kitchen is a single-handle faucet.

Bath Sink, Shower & Accessories

The sink in the bathroom is a solid, continuous surface. When cleaning this surface, use care to prevent scratching or marring it. The typical bathroom accessories include a towel bar and a tissue holder.

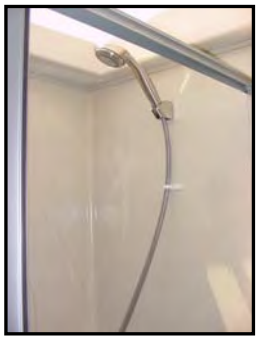


Figure 11-4. Shower

The single-handled faucet (Figure 11-3) in the bathroom was chosen to match the specified decor. The bathing facilities (Figure 11-4) installed may be a fiberglass shower or combination shower/tub with a glass shower door. The tub faucet with showerhead, hose, and bracket are coordinated with the sink

Figure 11-3. Bathroom Sink and Faucet

faucet.

Water Pump

The water pump is self-priming and totally automatic, operating on demand whenever water is required. The water pump is used to pressurize the freshwater system when the unit is not connected to city water. The switches (Figure 11-5) to this pump may be located in the bathroom, or sanitation-service compartment (Figure 11-6). To start the pump, follow these instructions:

Fig. 11-5. Water Pump Switch

1. Fill or partially fill the fresh water supply tank.
2. Open the kitchen and bathroom faucets.
3. Turn the water pump switch "on" and allow the water to fill the water line and the hot water heater.
4. Close each faucet after it delivers a steady stream of water (close the cold-water faucet first). Leave the hot-water faucets "on" until they also deliver a steady stream of water. This procedure will assure that the water heater is filled with water.
5. The water pump should stop running once all faucets are closed.
6. The water pump is now ready for automatic operation. The pump will run when a faucet is open and stop when a faucet is closed.
7. Never allow the pump to run for long periods of time without water being present in the supply tank, as doing so may cause physical damage or blow fuses.

Figure 11-6. Water Pump Switch

If water does not flow when a faucet is turned "on" while using the demand system, use the following troubleshooting chart:

Troubleshooting Chart of Automatic Demand Water System for No Water Flow	
SITUATION	**SOLUTION**
Pump running, but no water flow	1. Fill Tank 2. Clear the water line to the pump
Pump not running	1. Check the pump switch 2. Check the 12-VDC fuses 3. Check the electrical connections 4. Check the battery

All of the water should be drained from the freshwater system when the unit is not in use for extended periods. For more detailed information regarding the water pump, one should refer to the water pump manufacturer's brochure in your Allegro Bus Owner's Information Package.

City Water Connection

When connecting your mobile home to an external source of city water, be certain to use the water hose manufactured and labeled for potable water service--this will assure that the hose selected for

use will not alter the taste of the water. To connect the city water supply to the motor home, connect one end of the power retractable hose (Figure 11-7) to the city water supply; this connection will usually be to a faucet or valve similar to your garden hose valve at home.

Turn the city water supply "on" for a few seconds to clear the line. Once the hose has been flushed, turn the supply "off." Connect the other end of the hose to the city-water connections on the motor home.

Figure 11-7. Power Hose Reel

Once the city water fill valve is opened, water is supplied to the freshwater system including the hot water heater, faucets, and toilet. Turn "on" the water supply and open all of the faucets to clear any trapped air within the plumbing lines within the motor home.

Once any air pockets have purged from the water lines and water flows freely, close all of the faucets. The city water supply is pressurized (usually 60-80 psig); therefore, the water pump is not needed when the water system of the motor home is connected to the city water system.

To disconnect the motor home from the city water supply, close the valve and remove the hose from the city water supply. Disconnect the hose from the city water connection, drain it, and store the hose in the water compartment of the motor home.

Filling the Freshwater Tank

The freshwater tank is normally filled from the city water connection. The city-water valve (Figure 11-8) located in the sanitation compartment near the water connection determines whether the city water is going through the motor-home water system or into the freshwater tank. Since there is not an automatic shut-off when filling the freshwater tank, check the level from the monitor panel while filling the freshwater tank on the motor home.

The excess water will be vented from an overflow in the vent pipe onto the ground when the capacity of that tank has been reached. This pipe is installed in the freshwater tank to prevent possible tank rupture from inadvertent overfilling.

All of the water should be drained from the freshwater system when the motor home is not in use for an extended period of time.

Figure 11-8. Water Fill Valve

Sanitizing

To assure complete disinfecting of the freshwater system, it is recommended that the following procedure be performed on a new system, on one that has not been used for a length of time, or one that may have become contaminated. This procedure is also recommended before long periods of storage, such as during the winter months:

1. Drain the freshwater tank by opening one valve. There is one valve for each water tank. All of the faucets should be in the closed or "off" position.

2. Prepare a chlorine solution using one gallon of water and one-half cup of chlorine bleach (5% sodium-hypochlorite solution). Prepare enough of the chlorine solution to administer one gallon of solution for every 15 gallons of tank capacity. For sanitizing this tank, prepare 4½ gallons of the chlorine solution. This mixture puts a 50 ppm (parts per million) residual chlorine concentration in the water system that will act as a quick-kill dosage for harmful bacteria, viruses, and slime-forming organisms. Concentrations greater than 50 ppm may damage the water lines and/or the tank.

3. Once the freshwater tank is empty, close the valve in the water tank.

4. Pump the chlorine solution into the tank by taking the hose attachment and attaching it to the pump and then put in the chlorine solution. Cut off the vale between tank and the pump has to be turned to "off." Turn the tank fill valve from "city water" to "tank fill" (Figure 11-9). Turn "on" the water pump until all of the solution is pumped into the freshwater tank.

5. Turn "off" the water pump. Open the valve from the tank to the water pump. Fill the water tank with the city water tank fill (or by using the same method as was used to put the sanitizing solution into the tank).

6. Remove the water filter (located in the sanitation compartment outside the motor home) and put filter housing back on. Open each faucet, in turn, including the kitchen faucet, bath faucet, inside and outside showers, turning "on" both the hot and cold faucets and flushing the toilet until all of the air has been purged from the pipes and the water runs freely. The entire system will then be filled with the sanitizing solution.

7. Allow the 50 ppm disinfecting solution to stand in the system at least four hours.

8. Drain the system and flush it with freshwater. The water system needs to be flushed with water repeatedly, if necessary, until there is no chlorine taste or smell left in the system. To remove any excessive chlorine taste or odor that might remain, prepare a solution of one quart of vinegar to five gallons of water. "Rock" the tank containing the solution by moving the motor home forward and backward several times to clean the tank; then drain that tank and refill with clean water.

Water Filter

This unit is equipped with a water filter (Figure 11-9) which must be removed before disinfecting the freshwater system. First remove the water filter and then install the cover back on the housing. The water filter is located in the sanitation compartment on the outside of the motor home. The filter will remove chlorine, dirt, and other matter.

Figure 11-9. Water Filter

The filter will also eliminate most phenol (or similar) odors and tastes while delivering sparkling, taste-free water for drinking and cooking. The filter is not guaranteed to remove the tastes and odors of iron and sulfur. To remove these impurities, one would need to chlorinate the water. Replacement filters are available that will filter iron and sulfur. Ask your dealer or RV supply center about purchasing an iron and sulfur filter, if such is desired.

If you are traveling in an area where the water has a high iron and sulfur content, then add one tablespoon of chlorine bleach to every 10 gallons of water in your tank--this will precipitate the iron or sulfur so that the filter can remove those impurities. If you are at a site where the unit is connected to a city water supply, you will not be able to chlorinate the system because the water flows straight to your faucets and not through the freshwater tank. Filters should be changed every 6-12 months depending on the quality and quantity of water that is used in your motor home.

Water Heater Bypass System

The water heater bypass valve (Figure 11-10) is located in the exterior sanitation compartment of the motor home. By closing the water heater supply valve and opening the bypass valve, one can divert water away from the water heater. This process is performed when winterizing your motor home.

Figure 11-10. Water Heater Bypass

This process is performed when winterizing your motor home. Using the bypass valve will keep antifreeze out of the water heater when winterizing the motor home. Draining the water heater during winterizing is a MUST. If not properly drained, the water heater would be subject to damage from possible freezing/thawing cycles. To prepare the motor home for reuse, switch the bypass valve back to its normal position and re-fill the water heater.

Freshwater Lines

Vibration and flexing encountered when the motor home is traveling can cause pipes and fittings to become loose. Check all of the plumbing connections for leaks at least on an annual basis. If the water pump runs when all faucets are turned "off," check for a possible leak. Be sure that the drain valves are closed.

Connections at the kitchen and bathroom faucets normally seal by hand-tightening them and then making an additional half-turn with a wrench. If a fitting leak persists, disconnect it completely and visually inspect it for mineral deposits or foreign material stuck on the sealing surfaces. Clean the surfaces thoroughly and reinstall

the fitting. Take the motor home to an authorized Tiffin Motorhomes service center for additional repairs if the water system continues to leak. Follow the winterizing instructions given in Chapter 14 to reduce risk of leaks caused by cracks from freezing pipes. Left unchecked, freezing damage can be extensive and expensive.

WASTEWATER SYSTEMS

General Information

The waste drainage system was designed to provide adequate and safe storage and/or disposal of waste materials. All of the materials used in the fabrication of this system are tested by a nationally recognized testing laboratory. The drainage system uses plastic piping and fittings connected to the sinks, toilet, and holding tanks. This plumbing permits the drainage of these fixtures to an outside termination.

The motor home should be reasonably level for best operation of both of the wastewater systems (there are two, separate wastewater systems). The gray-water system is for wastewater from the sinks and shower. The black-water system is for sewage waste from the toilet. Each wastewater tank has its own control valve and both drain through a common sewer-drain hose.

Toilet

The toilet (Figure 11-12) in your motor home is specifically designed for recreational-vehicle service. The toilet operates with water from either the fresh water tank with the water pump "on" or the city water supply. Before using the toilet, add water to the bottom of the tank. Refer to the "BLACK WATER TANK" instructions elsewhere in this chapter. The toilet flushes waste directly into the black-water holding tank. The toilet uses high-velocity water injection to produce swirl effect in the bowl.

Figure 11-12. Toilet

The greatest problem that causes stool solids to accumulate in the holding tank is lack of liquids. When using your toilet, it is wise to fill the toilet 3/4 full of water--this will help wash the solids away from directly below the toilet and to assure complete dumping of the holding tank.

Simplified instructions for the use of the toilet are as follows:

To add more water to the toilet bowl: Pull up the flush handle OR push the "Add Water" switch (depending on what model is installed in your coach) until the desired water level is attained. To prevent overflowing the toilet, a timer inside the control module limits the amount of water that can be added.

To flush the toilet: Push the flush handle down OR push the "Flush" switch (again, depending on what model is installed in your coach), then release it. Holding the handle or switch down will not prolong the flush cycle nor start a new flush cycle. The handle or switch must be allowed to return to the neutral position before another flush can occur.

Mode Switch:

The Mode switch is located on the right side of the control module. It lets you switch between three function settings:

- Normal—use this setting for flushing the toilet.
- Service—use this position for cleaning the toilet bowl and flush ball seal. The flush ball will open automatically and remain open in this position. Lifting up the flush handle or pushing the "Add Water" switch provides water to the bowl.
- Manual Override—use this position to flush the toilet manually in the event of power or battery failure. This switch disconnects the electronic brake in the flush valve motor, and allows manual flushing via the override access hole in the side of the vitreous china base.

Note: The control module allows 15 seconds of water flow for cleaning. If more water is required, return the switch to the NORMAL position, then back to the SERVICE position.

A safety circuit in the control module monitors flush ball operation. If foreign objects or low voltage prevent the flush ball from closing, this circuit prevents personal injury or damage to the flush valve monitor. If this condition occurs, reset the control module by placing the Mode switch into the SERVICE position temporarily, then returning it to the NORMAL position.

The toilet should be cleaned regularly for maximum sanitation and operational efficiency. Clean the toilet bowl with a mild bathroom cleaner. **DO NOT USE CHLORINE OR CAUSTIC CHEMICALS, SUCH AS LAUNDRY BLEACH OR DRAIN-OPENING TYPES, AS THEY WILL DAMAGE THE SEALS IN THE TOILET AND DUMP VALVES**.

Refer to the toilet-manufacturer's owner's manual in your Allegro Bus Owner's Information Package for complete instructions and a detailed troubleshooting guide.

Caution

It is important that you use as much water as possible with each flush. This will help prevent tissue and other solids from clogging the holding tank outlet.

P-Traps

Each of the sink drains, the shower drain, and the washing-machine drain (if so equipped) has a water trap (P-trap) to prevent holding-tank odors from entering the motor home. These traps must have water in them to trap odors. When the vehicle is in motion, the water may splash out of the sink and shower drains. When the motor home is stored, the water may evaporate from these traps allowing odors to enter the motor home. If this occurs, run water from the faucet into the drain, thus allowing water to fill the traps again. A good practice would be to run a little water into these drains on a monthly basis.

Black-Water Holding Tank

The "black water" (i.e., sewage) holding tank is located directly beneath the toilet. Before using the toilet, you will need to treat the tank with water that is mixed with an odor-controlling chemical. These chemicals are readily available at any RV supply store. Be careful not to spill the chemicals on your hands, clothing, or the carpet because such may cause a permanent stain. Pull the toilet levers forward to allow the chemicals to mix with the toilet water. Continue pulling the toilet levers until a depth of at least one inch of solution is directly under the toilet. Release the levers and the waste tank is now ready for use.

Caution

Use only approved RV odor-controlling chemicals in the holding tanks. Products containing ammonia and petroleum will damage the ABS plastic holding tanks and seals.

Gray-Water Holding Tank

The gray-water holding tank is located in the underbelly of the vehicle. It is primarily used for the drainage from the kitchen and bath sinks and the shower.

Wastewater Disposal

Both of the holding tanks terminate in a valve arrangement that permits draining each tank separately or together (Figure 11-13). It is recommended to drain the black-water tank first before draining the gray-water tank. This procedure permits the water from the gray tank to wash the black-water residue from the drain lines and hose. The valves that open to release the water are called gate valves.

The blade that closed the opening in the sewer drainpipes is connected to the T-handle to release contents of the tank(s) when pulled. The sewer line must be securely capped

Figure 11-13. Sanitation Compartment Containing Holding Tank Drains and Flexible Drain Hose

during self-containment use to prevent leakage of waste materials onto the ground or pavement. Do not pull the holding tank gate valve "open" when the protective cap is installed on the pipe. Always drain the tank into an acceptable sewer inlet or dump station.

Whenever possible, drain both the holding tanks prior to traveling. The carrying capacity of your vehicle will be reduced if water is left in the black or gray tanks.

The holding tanks should only be drained when they are at least ¾ full. Doing this will provide a sufficient volume of water to allow the complete flushing of waste materials in the drain lines and hose. If the tanks are not ¾ full, add enough water to allow for sufficient flushing.

To empty the wastewater tanks, connect the adapter, supplied with your vehicle, to the drain hose. If the adapter is lost or broken, another one can readily be purchased from any RV supply store. Once you have placed the adapter on the drain hose, it can remain there for the life of the hose. One end of the hose threads up through the hole in the bottom of the service compartment and the other end of the hose feeds into the sewer at the dump station.

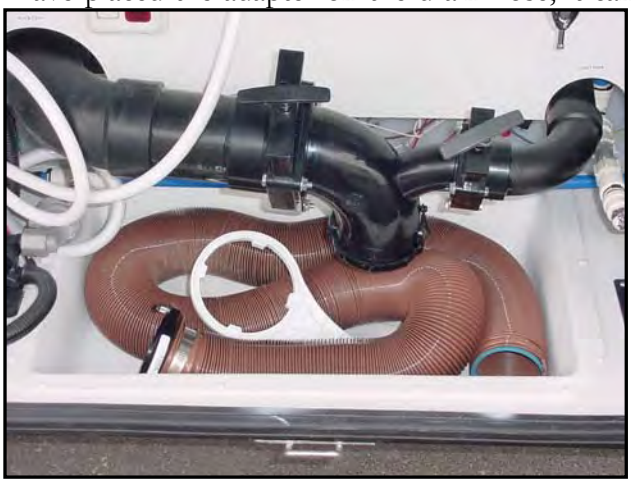


Figure 11-14. Sewer Hose and Drain Connections

Unscrew the cap from the drain. Connect the hose, with the adapter in place, to the drain fitting. Open the gate valve completely by pulling on the T-handle. The tank will start to drain as soon as the T-handle is pulled. After you have drained the black-water tank, immediately drain the gray-water tank. This procedure helps to flush the black water from the sewage hose.

When both of the tanks are empty, flush them with a freshwater rinse before you close the valves. The gray tanks are easily flushed by pouring a couple of gallons of water into a sink drain. The drain outlet is engineered for quick release of the drain hose adapter. Always close the gate valves and secure the end cap to prevent leakage while the vehicle is in transit.

After draining the black-water tank, it is recommended to add a holding-tank deodorant to help control the odor and break down the solids. Follow the instructions given on the holding-tank deodorant package.

When using dump stations for draining the holding tanks, keep other travelers in mind. Please practice good housekeeping! Leave the dump stations in good order. Above all, **do not pollute**!

Sewer Connection and Camping

When camping at parks with sewer connections, it is important to keep the black-water, holding-tank, gate valve closed at all times, except when dumping. The gray tank can be kept open while hooked to a sewer connection, but again, the black-water tank must be kept closed. This is done so that an ample quantity of liquid remains in the tank to provide a smooth flow through the gate and drain valves when dumping.

Caution

The gray tank valve must be in the "open" position when operating the optional washing machine.

Sufficient liquid in the tank causes a swirling action that should take any accumulated solid wastes with it. Accumulation of solid wastes in the black-water tank can be avoided by keeping the gate valve closed when connected to the sewer connection. If the valve is open, solid wastes may accumulate in the tank which may eventually result in costly repairs.

No-Fuss Flush

This vehicle may be equipped with a flushing system for the black-water holding tank. When draining your sewer tank, attach a water hose to the sewer spray connection. After the tank is drained, leave the gate valve "open" and open the water valve to allow water to spray inside the black-water tank; this will clean the inside of the tank of any debris that may be left inside the tank. After this is done, disconnect the freshwater hose and close the gate valve.

Caution

Be sure the gate valve is "open" when flushing the tank. Do not use the same hose for the No Fuss Flush that is used for filling the fresh water tank.

Exterior Shower

Your Allegro Bus has an exterior shower (Figure 11-15, left-hand side) for your use and convenience outside. That exterior shower is located in the sanitation service compartment, which is located on the driver's side of the motor home. The exterior shower feature allows you to do such things as rinse off sand or grass, muddy shoes, or bathe yourself outside of your motor home.

The faucet operates just as it would in your kitchen or bathroom. In addition to the shower itself, there is also a soap dispenser conveniently situated in that same compartment and a light to permit use under low-light conditions.

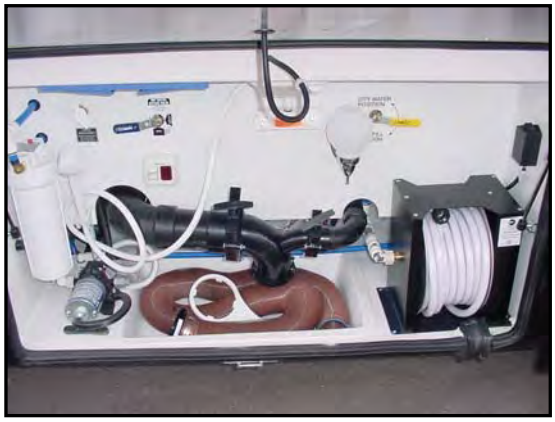


Figure 11-15. Exterior Shower in Outside Compartment

Hydro-Hot Heating System *(Optional)*

The Allegro Bus may be equipped with an optional Hydro-Hot heating system (Figure 11-16) that provides a continuous, on-demand supply of domestic hot water, as interior zone heating where and when it is needed. Both heating features are accomplished by a unique VDC-Powered Diesel-Fired Burner and a VAC-Powered Electric Heating Element (120 VAC). These two heating sources maintain the temperature of the Hydro-Hot's solution of water and antifreeze.

Figure 11-16. Hydraunic Heating System

To activate the optional Hydro-Hot heating system, the hydro-hot switch (labeled "diesel burner switch") located in the side cabinet above the driver's seat must be activated. By activating this switch, a supply of hot water as well as interior heat can be provided. The heating feature will be controlled by the thermostat mounted on the wall. It is operated off the furnace function of the thermostat to provide interior heat. Hot water will be supplied instantaneously and continuously at any time the diesel burner switch is activated.

If interior heat and hot water are demanded from the Hydro-Hot system at the same time, hot water will simultaneously take precedence over interior heat; therefore causing the interior heat to shut down and turn off until the water flow is turned off from water sources.

Also featured in the Hydro-Hot system is an electrical burner switch. With this switch activated and shore power available, it will supply a very limited amount of hot water and limited interior heat.

Figure 11-17. Surge Tank

The surge tank (Figure 11-17), located in the basement, should be routinely inspected to make sure the antifreeze fill line stays in the acceptable zone. If the antifreeze becomes low, you must add the recommended antifreeze stated in the Hydro-Hot's owner's manual. If antifreeze is totally depleted from the surge tank, a switch will be released inside the main Hydro-Hot tank disabling the system from operating. Antifreeze will then have to be added to the tank to rectivate the switch and allow the system to operate.

If batteries accidentally become discharged and the Hydro-Hot system is activated, the system will automatically shut down before batteries are totally discharged. Once power is restored to batteries, the system must be reset on outside control board (Figure 11-17).

Figure 11-18. Control Panel

For detailed instructions on operating the Hydro-Hot Heating system, refer to the specific owner's manual found in the Owner's Information Package.

Caution

Your Hydro-Hot heating system operates off the coach's sole diesel tank! Keep in mind that the Hydro-Hot fuel tube is located higher up in the diesel tank than the coach's engine fuel in order to prevent complete depletion of the diesel fuel tank. Be sure an adequate amount of fuel is in the fuel tank before dry camping.

Caution

Yearly maintenance is required on the burner portion of the Hydro-Hot heating system.

Caution

DO NOT operate the Diesel-Burner and/or the Electric Heating Element without the water and antifreeze solution in the Hydro-Hot's Boiler Tank. Failure to do so will cause serious damage to the Heater.

For detailed instructions on operating the Hydro-Hot Heating system, refer to the specific owner's manual found in the Owner's Information Package.

Chapter

12

Windows, Awnings, Vents, & Doors

Windows

The windows on the Allegro Bus are of the sliding type. These double-pane windows also provide additional thermal control (i.e., insulation) to maintain interior temperatures better. In the double-pane windows, a "dead air" space (filled with a dry, inert gas) is sealed between the two panes of glass—this "dead air" space provides additional thermal insulation for the windows and prevents them from fogging internally. Additionally, there may be a reflective coating on the windows to reflect back a portion of the sunlight to reduce the heating of the motor-home interior and to reduce the effects of the sun's "bleaching" of interior fabrics (curtains, upholstery).

Figure 12-1. Emergency Exit Window

For both the driver's and the passenger's windows, additional sun shades are available to permit blockage of the sun's rays which may interfere with driving. These shades can be deployed, as needed, and then moved out of the way when no longer desired.

In the bedroom, one particular window will be marked with an "EXIT" label—this is an emergency escape (Figure 12-1) to be used only when normal exits are blocked or inaccessible. To use this emergency escape, merely lift the red handles at the bottom of the window and push outwards to open the window. Should it be necessary to use this exit, please look for a secure footing when exiting so that no personal injury is sustained in the process. It is also prudent, when parking the motor home, to be aware of where this "emergency-exit" window will be situated so that it is not inadvertently blocked or impeded from its normal, intended operation, should such become necessary.

Awnings

Your Allegro Bus may be equipped with a power patio awning and controller (Figure 12-2). If so, use the following directions to operate the awning properly: **NOTE:** You may first have to program the key fob which can remotely activate the awning; please consult the owner's manual for the power awning for directions on the programming process. It is imperative that you read the specific owner's manual for the awning located in the Owner's Information Package.

Extending the Awning:

1. First, examine the area where the awning is to be deployed and make sure that there are no obstructions that may impede the opening of the awning.

2. Make sure that the weather conditions warrant opening the awning; for example, the wind isn't too blustery or no major storm fronts are soon to be expected in the immediate area.

3. One can either use the **remote rocker switch located on the awning control box** (Figure 12-2) or the **key fob** (Figure 12-3) to deploy the awning. For the remote rocker switch located on the control box, press and hold the "Extend" button for three

Figure 12-2. Dometic Awning Control Box

seconds and the awning will automatically open. For the remote control key fob, press and hold the "Extend" button for three seconds and the awning will automatically open. If the remote rocker switch or the remote control key fob are not held for three seconds the awning will remain in the position when button is released and will continue to extend when pressed again.

Figure 12-3. Dometic Awning Key Fob Controller

NOTE: When the power has been interrupted, wait approximately 30 seconds before depressing button again. The control box will automatically restore power when button is pressed again.

NOTE: When installed correctly on a motorized RV, this system is wired to prevent accidental awning "extension" when vehicle ignition key is in the "ON" position. When the ignition key is turned "ON," the "extension" mode is de-activated and the awning will not extend. This however, will not prevent the awning from being retracted.

The awning is equipped with a wind sensing device that will automatically close the awning when wind conditions are present that may damage the awning. The factory preset setting is 18 mph. To activate the wind sensor feature, locate the control box (Figure 12-2), simultaneously depress and hold buttons 1 and 2 on the Remote Control Key Fob for three seconds. One of the wind speed LED's will illuminate.

To de-activate the wind sensor feature, simultaneously depress and hold buttons 3 and 4 on the Remote Control Key Fob for three seconds. There are no wind speed LED's illuminated when de-activated. Damage to the awning may occur in high winds if the awning is left in the open position with this feature de-activated. Wind sensor is activated when shipped from the factory.

IMPORTANT: DO NOT attach or hang any objects from the awning or tie the awning down. If the sensor is activated or the retract button is depressed and the awning rolls up, damage to the awning and attached objects may occur. Obstructions in the proximity of the wind sensor can diminish the sensitivity. If wind sensor is de-activated and damage to the awning occurs, the awning warranty may be void. The wind sensor is specifically designed to allow air to pass across sensor probe.

IMPORTANT: The wind sensor will only function correctly if the airway to the sensing probe is clear. Keep airway clear of dust, insects, ice, snow, or other debris. The sensing probe can be cleaned with a mild soap solution and a small soft bristle brush.

Caution

Since damage resulting from weather is not under warranty, anytime a heavy or prolonged rain or blustery winds are anticipated, it would be advisable to retract the awning. Similarly, if the awning is to be left unattended for any prolonged length of time, it would be prudent to retract that awning.

Retracting the Awning:

1. Make sure that nothing (e.g., nearby tree, patio torches) obstructs the intended movement of the awning.

2. One can either use the **control box** or the **key fob** to retract the awning. For the remote rocker switch, press and hold the "Retract" button for three seconds and the awning will automatically close; for the remote control key fob, press and hold the "Retract" button for three seconds and the awning will automatically close—either action will cause the awning to retract to its fully closed position. If either method is not held for three seconds, the awning will remain in the position when button is released and continue to close when pressed again.

NOTE: If one wishes to protect the awning automatically from possible windy conditions which may damage the awning, set the wind sensor switch on the console to the "on" (usually upper) position. To disable this function, set the wind sensor switch to the "off" (usually down) position.

Emergency Retracting Procedure for the Awning:

If the automatic retracting of the awning isn't possible, one may manually close the awning using the following procedure: (This procedure will require two people. Once this procedure has been performed, the awning must be serviced by a Dometic Service Center or a qualified service technician before using again.)

1. Slide the pull strap (provided) into the utility slot of the Fabric, Roller Tube, Torsion Assembly (FRTA) [see the Weather Pro Power Awning Diagnostic Service Manual {Dometic Corporation} for illustration].

2. While one person holds the pull strap, remove the bolt in the top of the right top casting (see picture in the awning owner's manual for details). The FRTA will retract (i.e., "roll in") once the bolt is removed. Walk the awning to its retracted position (i.e., fully closed).

3. When the awning is fully retracted, replace the bolt to prevent the awning from accidentally opening during travel. NOTE: After this procedure has been performed, have the awning serviced by a Dometic Service Center or a qualified service technician before any further attempts are made to open the awning.

Vents

The kitchen has a 12 VDC Fantastic vent fan (Figure 12-4) installed to exhaust kitchen odors. For normal operation, the vent is controlled by a thermostat mounted on the vent. Once the vent power switch is in the "on" position and the thermostat is set to a particular temperature, the vent fan will operate until the temperature set-point is reached; at which time the vent fan will automatically turn "off." The vent fan should only be left in the "on" mode when the motor home is parked and in use.

Figure 12-4. 12 VDC Vent Fan

If the motor home is to be unattended for long periods of time or is to be in storage, make sure that the vent fan is turned "off." Were the fan left "on," blustery winds or severe storms may prevent the vent from closing and, consequently, may permit leakage, with possible damage, into the motor home. The bathroom also contains a 12 VDC, vent fan which is controlled by an "on/off" switch mounted on the bathroom wall.

Doors

Caution

Always secure the dead bolt lock while the motor home is in motion to prevent accidental opening of the entrance door.

Figure 12-5. Front Door

The primary entrance door (Figure 12-5) to the motor home is a radius door having a key lock and a dead bolt for additional security. When the door is fully opened, the door hinge automatically holds the door in an "open" position.

There is also a screen door (Figure 12-6) associated with the entrance door; the screen door will permit increased air circulation when the entrance door is open. To enjoy this benefit, the screen door is operated independently of the entrance door.

Figure 12-6. Front Door & Screen Door

However, when one wishes to close the screen door and the entrance door at the same time; the screen door latch must be fastened to the entrance door prior to closing the entrance door. Failure to do so will cause the screen door latch to be bent.

Keyless Lock

The Bus will be equipped with keyless lock entry that is incorporated into the grab handle (Figure 12-7). The keyless lock entry is essentially a numeric combination lock (Figure 12-8).

This type of lock for the motor home permits the owner to come and go without having to worry about whether the "house key" was with the owner or not. The keyless lock drastically reduces the inadvertent situation of being "locked out of one's home" while on the road.

Also included with the keyless entry is a key fob that will lock and unlock the entrance door as well as compartment doors. The headlights and clearance lights will flash, indicating that the door(s) are locked when pressing the lock button on the key fob.

Figure 12-7. Keyless Lock and Grab Handle

When pressing "unlock," the porch lights will be activated for 30 seconds.

As long as one remembers the appropriate combination (settable by the owner to permit optimal remembering of a preferred numerical combination—see Figure 12-8), one should never be "locked out" of the motor home under any circumstances.

Complete directions for setting one's unique keyless lock combination can be had in the Owner's Information Package.

As a further aid for night-time access to the motor home, the hand rail by the front door is made of a transparent acrylic which is lighted at night.

This "night light" hand rail permits the motor home owner easy and safe access to the motor home by providing a firm, easily seen handhold whenever one is entering or exiting.

Figure 12-8. Detail of Keyless Lock

Chapter

13

Routine Maintenance

EXTERIOR CARE

Important

Damage caused by improperly performed maintenance or inadequate maintenance is not covered by your Tiffin Motorhomes Limited Warranty.

Washing

Since 2003, Volatile Organic Compound regulations (formulated by EPA) prohibit the use of lead in paint. Lead made paint quite hard to prevent oxidation. Since 2003, paint manufacturing companies have had to find a new base for their paints. The paint on your Tiffin motor home has a polyurethane base called Diamont. While multiple layers of clear coat sealants protect the paint against oxidation, the sealant must be protected from deterioration or the paint will oxidize faster than the lead based paints of prior years.

Figure 13-1. Allegro Bus Exterior

Paint manufacturers advise against using harsh cleaners such as Simple Green, Mr. Clean, or liquid dish washing soaps. The degreasing agents in these cleaners leave a residue on the sealant, which soften and damage the clear coat in time. It's akin to the sticky residue felt on a linoleum floor after cleaning the floor with any heavy duty, degreasing cleaner.

Baby shampoo provides an effective yet gentle cleaner. Without the typical heavy degreasers of most detergents, baby shampoo cleans without fear of leaving a residue to gum up the clear coat finish. Generally one ounce (1 oz.) is all you need per five gallon bucket of water. Also, add one-half to one cup of food grade distilled white vinegar to your wash bucket. If your water is soft, one-half cup is sufficient. Hard water requires a full cup per five gallon bucket.

Vinegar serves a two-fold purpose. First, it boosts the cleaning ability of the baby shampoo so you don't need as much. Second, food grade vinegar is made from grain and slightly acidic. The naturally occurring acid neutralizes the alkaline in the water to prevent water spots from forming. Make certain your jug of vinegar states "food grade" or "made for pickles," otherwise it may be made from petroleum.

Sliding manufacturers for years have recommended using 100% cotton pads like Sof Wash for washing. Since the introduction of the new lead free paints, lambswool, even softer than cotton, is now recommended. Tiffin Motorhomes uses the lambswool pad carried by Mary Moppins. It allows you to safely wash your coach from the ground.

Do not mistake lambswool with imitations. Imitation pads are made from 100% polyester, which is plastic. Plastic imitations will scratch the finish—but the scratches are so minute that they are barely noticeable at first. Eventually, continued scratching will remove the clear coat from the surface of your coach, vehicle, boat, floor, cabinets, and furniture. For this same reason avoid microfiber products to wash or dry your motor home, car, boat, airplane, motorcycle, vehicle, furniture, or cabinets. Microfiber is made from 80% polyester.

Likewise avoid washing with brushes. Even though you may not see brush marks now, the damage will happen as the bristles wear down. One washing and your coach is fine but the next washing leaves it covered with scratches. Use lambswool wash pads to avoid these issues.

Use only 100% cotton towels to dry your vehicle. Be cautious of terry towels made in Taiwan and China. They are not checked for fiber content as they enter the USA and usually contain up to 30% polyester.

Adding vinegar to your wash water and washing in the morning or evening will help prevent water spots. Water spots damage the exterior of your coach the same way they damage glass shower doors. They etch their way into the surface and removal becomes difficult. Prevention becomes the key. Wash one side at a time, rinse, and then dry quickly first using Mary Moppins EZE Squeegee followed by a towel placed over the Cleaning Head. Buff water spots immediately with a 1000 grit polishing compound or RenewzIt—a product by Mary Moppins which removes water spots, scratches and oxidation.

To remove oil and grease remember an important rule of cleaning: Give your product time to work. Dab a bit of concentrated cleaner like CleanEz by Mary Moppins—never an orange based cleaner or one with petroleum distillates—onto a soft cloth. Apply to the oil spot and wait 10 to 15 minutes before rubbing lightly to remove the oil. Rinse immediately.

Seals

The seals (Figure 13-2) around the doors, windows, vents, slide-out trim, and external seams should be checked at least semiannually. Additionally, the roof seams should be inspected for cracking or peeling annually. If deterioration is noted during a routine-maintenance inspection, reseal the seams or seals with an approved sealant to prevent leaks.

Figure 13-2. Typical Seals on Allegro Bus

Your Tiffin Motorhomes dealer can perform the resealing inspections and subsequent work, if any, for you. It is recommended that a Tiffin Motorhomes authorized service center perform these inspections periodically and perform necessary resealing when necessary.

Proper Sealants for Application

The following sealants are recommended for specific sealing applications, as noted in the table:

Recommended Sealants for Specific Sealing Applications	
SEALANT	**APPLICATION**
Plas-T-Cote	Metal or fiberglass roof
Surebond #SB-140	Rubber laminated to metal roof and ALL SKYLIGHTS
Carlisle #502-LSW Self-Leveling Sealant	Rubber roof over wood base
Silicone Sealant	To cover butyl and other sealants; not to be used as the main sealant
Parbond	To seal across tops of windows and the like on exterior surfaces where silicone is not used

Striping and Decals

The striping and decals (Figures 13-3, 4) on your motor home normally require very little maintenance. Treat these as you would any painted surface on your motor home. Wash them with mild soap and warm water or any retail car soap.

Figure 13-4. Rear View of Allegro Bus

Figure 13-3. Exterior Detailing of Allegro Bus

Never wash the motor home in direct sunlight, while the motor home is hot, or with hot water. Rinse thoroughly to prevent accumulation of any soap residues.

Use caution with high-pressure wash nozzles. Keep such nozzles at least 18 inches from the edge of the decals during any washing operations. If this is not followed, high-pressure water nozzles may cause the decals to loosen and subsequently to peel.

Test small sections of decals when using any type of cleaning solution.

Important

Do not use solvents such as acetone, MEK, toluene, and the like on the decals. Any solvent including alcohol may soften and smear colors. Do not use lacquer thinner or paint thinner on decals. Do not overcoat the decals with clear paint. Do not

allow gasoline or other fuels to come into prolonged contact with the decals. However, if this should occur, immediately flush the affected area with water.

Alcoa Aluminum Wheel Care

The care and maintenance of your aluminum wheel products are simple and require no special material or products; simply follow the directions included in the Owner's Information Package for these aluminum wheels. Timely care and cleaning will maintain the appearance of these wheel products for many years.

Important

Do not use harsh detergents, acids, or abrasives which may scratch or dull the surfaces. The applicator cloth, sponge, or soft-bristled brush should be non-metallic and non-abrasive.

Important

Remember to check periodically the tightness of your wheel lug nuts.

Roof Care and Maintenance

Proper care and maintenance of your motor home, including your roof, is important for sustained, trouble-free performance. Normal maintenance is simple and easy and does not require special materials. The roof of the motor home is fiberglass and can be cared for in the conventional manner. Keep the roof clean; one should clean the roof at least every three months. The roof should be professionally inspected on an annual basis for leaks. Sealant may be necessary in the second year of ownership.

Warning

Use caution when working on the top of your motor home. The wet roof may be extremely slippery and, as such, a possible safety hazard.

Moisture Management

This section outlines important recommendations to manage moisture in your motor home to avoid moisture-related damage, such as mold, which is caused by moisture. The materials and methods used to construct your motor home were selected in part to minimize air leakage and to create a weather tight exterior shell. However, in order to protect your investment and reduce the risk of moisture-related damage and costly repairs, attention and care has to be taken to manage moisture inside your RV. **Note**: These are only suggestions intended to minimize moisture-related issues with your motor home. If any concerns arise, contact Tiffin Motorhomes' Service Department at (256) 356-0261.

Interior Care of Your RV

Signs of excessive moisture can be obvious, such as water droplets forming on surfaces or wet carpet. Conversely, signs of excess moisture can be subtle, such as condensation forming on metal surfaces. When symptoms appear it is important to timely determine the cause of the excess moisture and take appropriate corrective action to prevent moisture related damage.

Control Relative Humidity

Monitoring and controlling relative humidity within the motor home is one of the most important steps to minimize the risk for moisture-related damage. Ideally, relative humidity should be at 60% or less. Relative humidity can be monitored utilizing a portable hygrometer (Figure 13-5), a small device that measures temperature and relative humidity. Hygrometers are available at electronics or building supply stores. Use exhaust fans, the air conditioner, and/or a portable dehumidifier to manage moisture inside the RV to maintain relative humidity at 60% or less. In cold climates, relative humidity may need to be at 35% or less to avoid window condensation issues. If the motor home is used the majority of the time in a hot-humid climate, it may be difficult to keep relative humidity below 60%. A dehumidifier will help, but is important to check the condensation (water) collection bucket regularly or discharge the condensation (water) directly to a drain.

Figure 13-5. Portable Hygrometer

Avoid Drastic Thermostat Setbacks

Cooler surface temperatures increase the potential for condensation and surface mold growth. To minimize the opportunity for condensation to form on interior surfaces, maintain a comfortable temperature in your RV, and avoid nighttime setbacks of 10 degrees or more. Drastic setbacks that reduce the indoor air temperature quickly can increase the chance for airborne moisture to condense on cool surfaces such as windows. If you are away from your RV for an extended number of days, it is recommended that you do not set the temperature back without taking other measures to manage relative humidity, including operating a dehumidifier with a continuous drain.

Manage Window Condensation

Window condensation issues can be identified by water or ice-build up, usually at the base of the window. The majority of these problems can be addressed by managing moisture generated inside the motor home. Minor condensation issues are not unusual, especially for RVs used in colder climates. The key is to manage this small amount of moisture if evident by wiping the surface, and as discussed in the "Control Relative Humidity" section, maintaining a reasonable relative humidity within the unit. To help minimize window condensation, use exhaust fans vented to the outside, avoid drastic changes in thermostat settings, do not use "vent-free" heaters and use window coverings wisely. For example, make sure to open curtains or blinds during the day to allow air to circulate and warm the window surface.

Carpet Care and Moisture Management

To keep your carpet serviceable and looking new for years to come, the carpet should be cleaned when it shows signs of discoloration or traffic patterns. A steam cleaning system should be used to clean the carpet unless other noted in your warranty information. To manage moisture from the cleaning process, the cleaning system needs to be capable of extracting the excess water from the carpet after it has been cleaned. **Important**: Be sure the carpet is thoroughly dry before closing up the RV for storage. Water from the cleaning process can cause significant damage to the RV if the carpet is not completely dry before closing up the motor home for an extended period.

Cleaning Tile and Wood Floors

Most floors only require a mild detergent and warm water for cleaning. More water on the floor is not always better for cleaning. Use a damp cloth to clean on a regular basis rather than wet mopping each time. For more information regarding the maintenance of the tile and wood floors, see the section entitled, "Woodwork and Floors."

Storage and Other Isolated Areas within the RV

Storage areas are more difficult to condition since the areas are isolated from the main body of the RV. The surfaces of these areas are more at risk for condensation and surface mold growth. To minimize this risk, clean storage areas regularly, and allow an air space between stored items and the exterior wall to promote air circulation.

Use of Un-Vented Combustion Equipment

Un-vented combustion equipment, such as propane stovetops are a source of moisture within the RV. For every gallon of fuel consumed, approximately one gallon of water vapor is evaporated into the air. Whenever possible, operate an exhaust fan in combination with the use of any un-vented combustion appliance within the RV. Water vapor and other combustion byproducts should be vented to the exterior of the RV. The RV owner should strictly follow use and maintenance instructions for safe operation of any combustion equipment, particularly un-vented equipment.

Exterior Care of Your RV

Figure 13-6. Inspecting Slide Out Gasket

The exterior shell of the RV is the primary weather and moisture barrier. Over the life of the vehicle, the shell will require regular care and maintenance in accordance with other instructions for exterior care. The shell includes the roof, sidewalls, windows, doors, and under-floor of the vehicle. Particular attention needs to be devoted to ensure these components are maintained to ensure a tight barrier against bulk water intrusion. The shell should be inspected periodically for tears, gaps, and condition of sealants in accordance with this owner's manual. Areas that require maintenance should be resealed utilizing a similar, high quality sealant used by the manufacturer. Particular attention should be devoted to ensure the slide outs are functioning properly. Each time a slide out is used it should be inspected to ensure proper operation and sealing (Figure 13-6). The slide out gaskets should also be inspected to ensure proper sealing when the slide out is operated.

Use of Your RV

It is important to remember that the square footage of an RV is significantly less than that of a single family residence. This fact alone will elevate the relative humidity because there is less volume of air to help absorb or dissipate the humidity. For example, showering and cooking create a lot of humidity in a small area. In these instances, use of an exhaust fan and opening windows should reduce the relative humidity, particularly when living in the RV for an extended period.

Severe Environments

Prolonged use of your RV in severe environments—for example in extremely cold or hot-humid climates, will require extra care and maintenance to avoid moisture-related issues. In both extremely cold and hot-humid climates more attention needs to be focused on controlling relative humidity within the RV. It also may require the use of a portable dehumidifier to manage relativity humidity within an acceptable range. This is discussed further in the "Interior Care of Your RV" section. If you have any questions about moisture-related issues in the environment you plan to use the RV in for a majority of the time, contact Tiffin Motorhomes' Service Department at (256) 356-0261.

Storage of Your RV

During those periods when your motor home is not in use, care must be taken to ensure moisture sources are addressed. Ideal storage of your RV would be in an enclosed climate controlled environment. When this is not possible, the following steps should be taken to ensure moisture is controlled:

- Turn off all water sources
- Turn off all combustion appliances
- Drain the water tank(s)
- Drain the water heater
- Open all closets, cabinet doors and drawers
- Close all windows and entrance doors
- Open a vent or a window enough to allow for some limited ventilation air flow, but not so far as to allow snow or rain to enter
- When storing the RV in high humidity climates (ambient relative humidity is greater than 60% year round), add a dehumidifier drained to exterior to control humidity inside the RV during storage
- Refer to other sections of this owner's manual for additional recommendations

Modifications to your RV

Consult Tiffin Motorhomes for guidance prior to making any modifications to your RV. It is important that changes be completed by a qualified service firm to ensure moisture intrusion or accumulation problems do not occur.

Wet Areas

Areas that are exposed to water spills or leaks should be dried as soon as possible and definitely within 24-48 hours. Drying areas quickly minimizes the chance for moisture damage and possible mold growth, which can begin to form colonies within 48 hours. A variety of methods can be used to help the drying process:

- Remove excess water with an extraction vacuum
- Use a dehumidifier to aid drying
- Use portable fans to move air across the surface

- Because moisture is key to mold issues, treat all signs of condensation and spills seriously and deal with promptly. Failure to deal with a moisture issue promptly may cause more severe issues where none initially existed, or may make a small problem much worse.

- Learn to recognize signs of mold—don't paint over or cover up suspicious discoloration until you are sure it is not mold. The affected surface must first be cleaned and dried; residual staining may be painted.

- Be sure to understand and eliminate the source of moisture accumulation as a part of the clean-up. Otherwise, the same issues will simply reoccur.

- Small amounts of mold should be cleaned as soon as it appears. Small areas of mold should be cleaned using a detergent/soapy solution or an appropriate RV household cleaner. Gloves should be worn during cleaning. The cleaned area should then be thoroughly dried. Dispose of any sponges or rags used to clean mold.

RV Finish Maintenance

Keeping your motor home looking its best at all times involves keeping the paint finish clean and in good condition. This means periodic washing and polishing, as well as getting the finish repaired as soon as possible when the paint is damaged or affected in any way.

The purpose of the paint finish is to provide an aesthetically pleasing appearance and to protect your vehicle from the environment. Your motor home is exposed o many environmental conditions that have an adverse affect on the paint finish:

- Road salts and sodium chloride

- Road tar/bugs

- Bird droppings/tree sap

- Industrial fallout/acid rain/pollution

- UV exposure and moisture

The most common problems resulting from these conditions are corrosion, staining and chemical spotting. These problems can be minimized through regularly scheduled washing and polishing.

Tire and Tire Safety Information

This portion of the Owner's Manual contains tire safety information as required by 49 CFR 575.6. The National Traffic Safety Administration (NHTSA) can be contacted at 1-888-327-4236. Their web site is: http://www.safecar.gov and their address is: NHTSA, 400 Seventh St, S.W., Washington, D.C. 20590.

Section One:

The National Traffic Safety (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site: http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling
- Help protect you and others from avoidable breakdowns and accidents
- Improve fuel economy
- Increase the life of your tires

This section presents a comprehensive overview of tire safety, including information on the following topics:

- Basic tire maintenance
- Uniform Tire Quality Grading System
- Fundamental characteristics of tires
- Tire safety tips

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

Safety First-Basic Tire Maintenance

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Under-inflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as

mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

Finding Your Vehicle's Recommended Tire Pressure and Load Limits

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

- Recommended tire size
- Recommended tire inflation pressure
- Vehicle capacity weight (VCW—the maximum occupant and cargo weight a vehicle is designed to carry)
- Front and rear gross axle weight ratings (GAWR—the maximum weight the axle systems are designed to carry)

For motor homes: Both placards and certification labels are permanently attached in the rear closet. You can also find the recommended tire pressure and load limit for your vehicle in the vehicle owner's manual.

Understanding Tire Pressure and Load Limits

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure—measured in pounds per square inch (psi)—a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kPa), which is the metric measure used internationally).

Vehicle manufacturers determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper tire pressure for your vehicle is referred to as the "recommended cold inflation pressure." (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Checking Tire Pressure

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

- Most tires may naturally lose air over time
- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking

- With radial tires, it is usually not possible to determine under-inflation by visual inspection

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

Steps for Maintaining Proper Tire Pressure

- Step 1: Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual

- Step 2: Record the tire pressure of all tires

- Step 3: If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure

- Step 4: If the tire pressure is too low, note the difference between the measured tire pressure and correct tire pressure. These "missing" pounds of pressure are what you will need to add

- Step 5: At a service station, add the missing pounds of air pressure to each tire that is under-inflated

- Step 6: Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure)

If you have been driving your vehicle and think that a tire is under-inflated, fill it to the recommended cold inflation pressure indicated on your vehicle's tire information placard of certification label. While your tire may still be slightly under-inflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly under-inflated tire. Since this is a temporary fix, don't forge tot recheck and adjust the tire's pressure when you can obtain a cold reading.

Tire Size

To maintain tire safety, purchase new tires that are the same size as the vehicle's original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

Tire Tread

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in tread-wear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

Tire Balance and Wheel Alignment

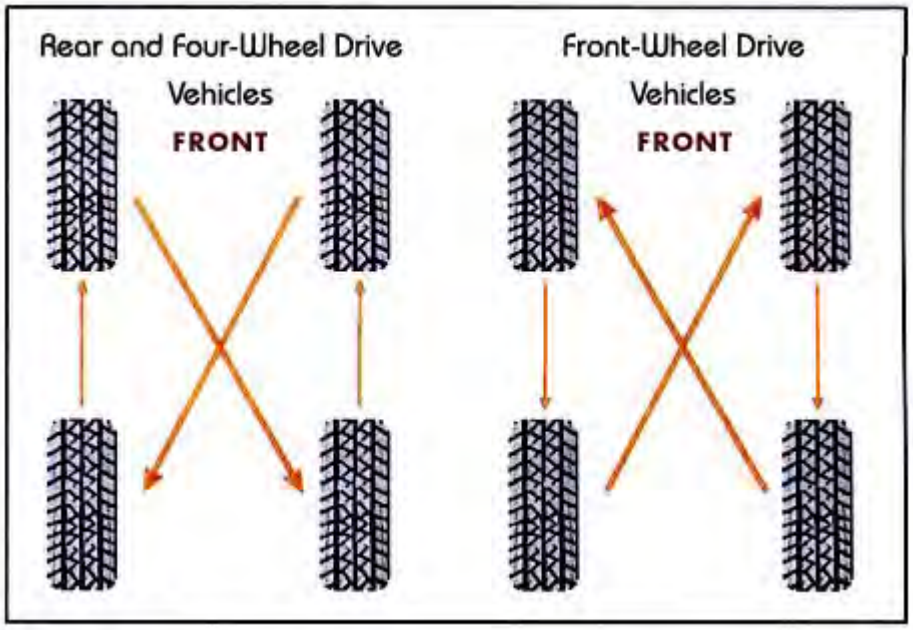
To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

Tire Rotation

Rotating tires from front to back and from side to side can reduce irregular wear (for vehicles that have tires that are all the same size). Look in your owner's manual for information on how frequently the tires on your vehicle should be rotated and the best pattern for rotation.

A Tire Rotation Example

For maximum mileage, rotate your tires every 5,000 miles. Follow correct rotation patterns.



Tire Repair

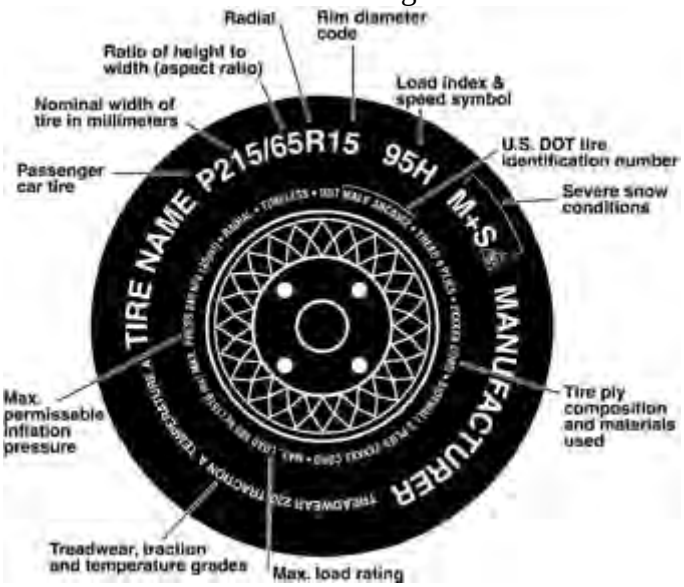
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

Tire Fundamentals

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

Information on Passenger Vehicle Tires

Please refer to the diagram below.



P—The "P" indicates the tire is for passenger vehicles. **NOTE**: Passenger car tires are not recommended for use on trailers, because the capacity ratings are not marked on the side walls of these tires. In the event a passenger car tire is used, the capacity must be de-rated by 10%.

Next number—This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

Next number—This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

R—The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.

Next number—This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel number.

Next number—This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. **NOTE**: You may not find this information on all tires because it is not required by law.

M+S—The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings.

Speed Rating—The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. **NOTE**: You may not find this information on all tires because it is not required by law.

Letter Rating	Speed Rating
Q	99 mph
R	106 mph
S	112 mph
T	118 mph
U	124 mph
H	130 mph
V	149 mph
W	168* mph
Y	186* mph

*For tires with a maximum speed capability over 149 mph, tire manufacturers sometimes use the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers always use the letters ZR.

U.S. DOT Tire Identification Number—This begins with the letters "DOT" and indicated that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact customers if a tire defect requires a recall.

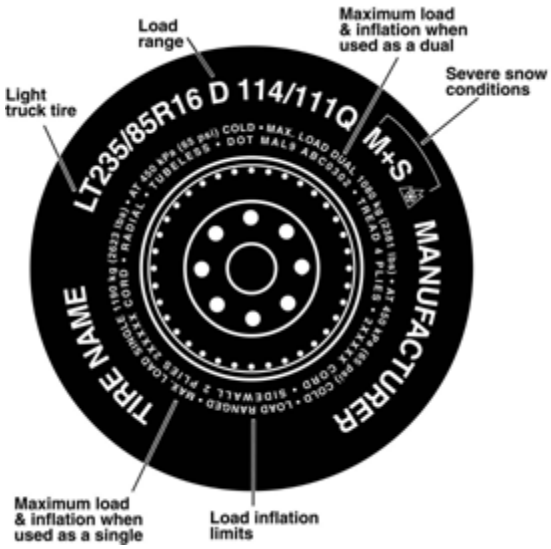
Tire Ply Composition and Materials Used—The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

Maximum Load Rating—This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

Maximum Permissible Inflation Pressure—This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Additional Information on Light Truck Tires

Please refer to diagram below.



Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

LT—The "LT" indicates the tire is for light trucks or trailers.

ST—An "ST" is an indication the tire is for trailer use only.

Max. Load Dual kg (lbs) at kPa (psi) Cold—This information indicates the maximum load and tire pressure when the tire is used as a dual; that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

Max. Load Single kg (lbs) at kPa (psi) Cold—This information indicates the maximum load and tire pressure when the tire is used as a single.

Load Range—This information identifies the tire's load-carrying capabilities and its inflation limits.

Vehicle Load Limits

Determining the load limits of a vehicle includes more than understanding the load limits of the tires alone.

On a motor home, there is a Federal certification label that is usually affixed in the rear closet.

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The certification label will indicate the vehicle's gross vehicle weight rating (GVWR). This is the most weight the fully loaded vehicle can weight. It will also provide the gross axle weight rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

For motor homes, in the same location as the certification label described above, there is a vehicle placard. This placard provides tire and loading information. In addition, this placard will show the vehicle's seating capacity for people and a statement regarding maximum cargo capacity.

Cargo Capacities

For motor homes, cargo can be added to the vehicle, up to the maximum weight specified on the placard. For motorized vehicles, the combined weight of passengers and cargo is provided as a single number. If fewer people are traveling, more cargo can be added. If more people are involved, the weight of cargo must be reduced. In any case, remember: the total weight of a fully loaded vehicle, including passengers, can not exceed the stated GVWR.

For motor homes, the water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the RV before it is loaded with people or cargo and is not considered part of the disposable cargo load. Water, however, is a cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo or people are being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel and camping needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your RV dealer to discuss the weighing methods needed to capture the various weights related to the RV. This would include weights for the following: axles, wheels, hitch and total weight.

How Overloading Affects Your RV and Tires

The results of overloading can have serious consequences for passenger safety. Too much weight on your vehicle's suspension system can cause spring, shock absorber, or brake failure, handling or steering problems, irregular tire wear, tire failure or other damage.

An overloaded vehicle is hard to drive and hard to stop. In cases of serious overloading, brakes can fail completely, particularly on steep hills. The load a tire will carry safely is a combination of the size of tire, its load range, and corresponding inflation pressure.

Excessive loads and/or under-inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure.

It is the air pressure that enables a tire to support the load, so proper inflation is critical. Since RVs can be configured and loaded in many ways, air pressures must be determined from actual loads (determined by weighing) and taken from the load and inflation tables provided by the tire manufacturer. These air pressures may differ from those found on the certification label. However, they should never exceed the tire limitation for load or air pressure. If you discover that your tires cannot support the actual weights, the load will need to be lightened.

Tire Safety Tips

Preventing Tire Damage

- Slow down if you have to go over a pothole or other object in the road.
- Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

Tire Safety Checklist

- Check tire pressure regularly (at least once a month), including the spare.
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Make sure your tire valves have valve caps.
- Check tire pressure before going on a long trip.
- Do not overload your vehicle. Check the Tire Information and Loading Placard or User's Manual for the maximum recommended load for the vehicle.

<u>Section Two:</u>

Steps for Determining Correct Load Limit

1. Locate the statement "The combined weight of occupants and cargo should never exceed XXX lbs" on your vehicles placard.
2. Determine the combined weight of the driver and passengers that will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.

4. The resulting figure equals the available amount of cargo and luggage capacity. For example, if the "XXX" equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.)

5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage capacity calculated in Step #4.

6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult this section to determine how this reduces the available cargo and luggage capacity of your vehicle.

Section Three:

Glossary of Tire Terminology

Accessory weight—The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

Bead—The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

Bead separation—This is the breakdown of the bond between components in the bead.

Bias ply tire—A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.

Carcass—The tire structure, except tread and sidewall rubber which, when inflated, bears the load.

Chunking—The breaking away of pieces of the tread or sidewall.

Cold inflation pressure—The pressure in the tire before you drive.

Cord—The strands forming the plies in the tire.

Cord separation—The parting of cords from adjacent rubber compounds.

Cracking—Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

CT—A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

Curb weight—The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

Extra load tire—A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Groove—The space between two adjacent tread ribs.

Gross Vehicle Weight Rating (GVWR)—The maximum permissible weight of this fully loaded motorhome.

Gross Axle Weight Rating (GAWR)—The value specified as the load carrying capacity of a single axle system, as measured at the tire-ground interfaces.

Hitch Weight—The vertical trailer load supported by the hitch ball.

Innerliner separation—The parting of the innerliner from cord material in the carcass.

Intended outboard sidewall—The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and /or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.

Light truck (LT) tire—A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

Load rating—The maximum load that a tire is rated to carry for a given inflation pressure.

Maximum load rating—The load rating for a tire at the maximum permissible inflation pressure for that tire.

Maximum permissible inflation pressure—The maximum cold inflation pressure to which a tire may be inflated.

Maximum loaded vehicle weight—The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

Measuring rim—The rim on which a tire is fitted for physical dimension requirements.

Non-pneumatic rim—A mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

Non-pneumatic tire assembly—A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

Normal occupant weight—This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

Occupant distribution—The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

Open splice—Any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

Outer diameter—The overall diameter of an inflated new tire.

Overall width—The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

Pin Weight—The vertical trailer load supported by the king pin of a fifth wheel hitch.

Ply—A layer of rubber-coated parallel cords.

Ply separation—A parting of rubber compound between adjacent plies.

Pneumatic tire—A mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

Production options weight—The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

Radial ply tire—A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

Recommended inflation pressure—This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification/ VIN tag.

Reinforced tire—A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Rim—A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Rim diameter—This means the nominal diameter of the bead seat.

Rim size designation—This means the rim diameter and width.

Rim type designation—This means the industry of manufacturer's designation for a rim by style or code.

Rim width—This means the nominal distance between rim flanges.

Section width—The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

Sidewall—That portion of a tire between the tread and bead.

Sidewall separation—The parting of the rubber compound from the cord material in the sidewall.

Test rim—The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

Tread—That portion of a tire that comes into contact with the road.

Tread rib—A tread section running circumferentially around a tire.

Tread separation—Pulling away of the tread from the tire carcass.

Treadwear indicators (TWI)—The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.

Vehicle capacity weight—The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle's designated seating capacity.

Vehicle maximum load on the tire—The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

Vehicle normal load on the tire—The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CFR 49 571.110) and dividing by 2.

Weather side—The surface area of the rim not covered by the inflated tire.

Wheel center member—In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attached, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

Wheel-holding fixture—The fixture used to hold the wheel and tire assembly securely during testing.

Tire Pressure

Correct tire inflation pressure is essential to maximizing the life of the tires and assuring the safety of the vehicle and its occupants. Driving with tires that are not correctly inflated for the load of the motor home is dangerous and may cause premature wear, tire damage, and/or loss of control of the motor home.

An underinflated tire will build up excessive heat that may actually approach the vulcanization temperature of the rubber and lead to tread separation and/or disintegration of the tire.

Additionally, underinflated tires will also cause poor handling of the motor home, rapid and/or irregular tire wear, and an increase in rolling resistance of the motor home which, in turn, produces a decrease in fuel economy of operation.

An overinflated tire will reduce the tire's "footprint" (i.e., its actual contact with the road); thus, reducing the traction, braking capacity, and handling of the motor home. A tire that is overinflated for the load that it is carrying will also contribute to a harsh ride, uneven tire wear, and the tire itself will be more susceptible to impact damage.

Maintaining correct tire pressure for each loaded wheel position on the motor home is critically important and must be a part of regular vehicle maintenance.

Tire Maximum Load Rating

Federal law requires that the maximum load rating be molded into the sidewall of the tire. If one looks at a tire sidewall, one may see some "**typical**" information, such as:

Max. Load Single 3640 Lbs at 85 psi cold

Max. Load Dual 3415 Lbs at 85 psi cold

The maximum load allowed for the size tire and load rating and the minimum cold air-inflation pressure needed to carry that stated maximum load are noted on the tire. Using less air pressure would reduce the load-carrying capacity of the tire. **The amount of air pressure one needs depends on the weight of the fully loaded motor home. Consequently, one cannot determine the correct air-inflation pressure, unless one knows the actual weights of the motor home**.

Weighing the Motor Home

Earlier, in Chapter 1, the procedures for weighing the motor home were presented (see pp. 1-7 and 1-8). These procedures provided the weighing of an "unloaded" (i.e., not stocked with the possessions and provisions the user would normally have onboard for travel) motor home. Obviously, any additional weight stored onboard (inside and underneath) the motor home will contribute to the overall weight of the motor home.

If not stored uniformly throughout the motor home, additional weight of the possessions and provisions of the motor-home user will load each axle and each tire differently (front-to-rear and side-to-side distribution of that additional weight). Accordingly, **it is necessary to weigh the motor home fully loaded as the user would have it for travel, including occupants.** Moreover, **it is necessary to weigh each tire position individually**.

Overloading the motor home can produce problems with the tires, wheels, springs, brakes, drive train, and other motor home assemblies. In addition, an overloaded motor home uses more fuel, is more difficult to handle properly, and can lead to driver fatigue more quickly. In a worst-case condition, if any component should fail, this could result in loss of control of the motor home and subsequent damage.

In certain states, the Highway Patrol routinely weighs motor homes to check for overloaded axle weights. Therefore, there are many good reasons for assuring that the motor home is properly loaded and not overloaded—this can be accomplished through a proper weighing of the fully loaded motor home.

One can find various places that have certified public scales where one's motor home can be weighed. For example, moving and storage company lots, farm suppliers with grain elevators, gravel pits, recycling companies, and large-scale commercial-truck stops are some of the possible locations for weighing the motor home. One can also check the Yellow Pages of the telephone book for "scales – public" or "weighers" to determine other locations for weighing the motor home. A brief overview of the

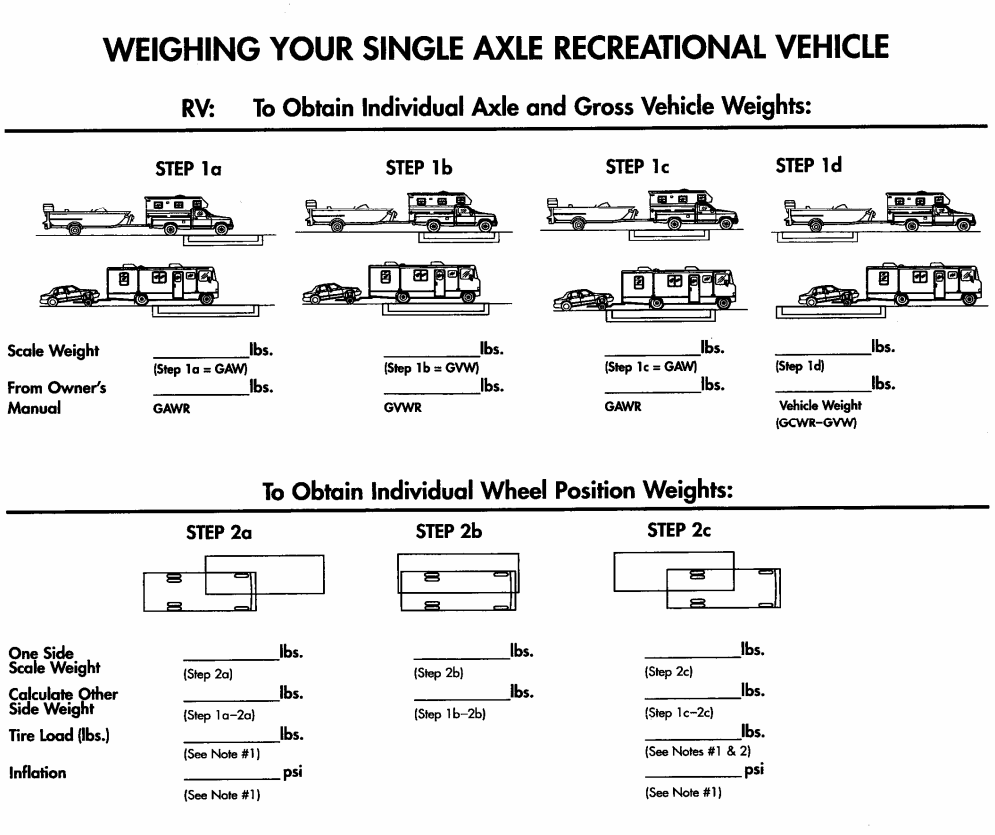

Figure 13-7. Procedure for Weighing the Motor Home (Each Tire Position Individually)

procedure for weighing the motor home is shown in Figure 13-7.

Note 1: From the tire manufacturer's load and inflation tables or the sidewall of the tires mounted on the motor home.

Note 2: If the motor home has duals, read dual capacity from the tire and multiply by 2 (two) to obtain dual-assembly load-carrying capacity.

More detailed information can be found in the manufacturer's literature (Figure 13-8) associated with the chassis and/or the tires provided with the motor home. For example, the following table illustrates the inflation pressures for Michelin tires as a function of the loads per position for a specified speed of the motor home. In this manner, one can determine the appropriate inflation pressures for each of the tires on the motor home, as a function of the loads they are to carry on the trip(s) the motor home is to take.

INFLATION PRESSURES FOR MICHELIN TIRES

Size/Model	Load Range	Inflation Pressures (PSI) Loads Per Position (in lbs.) at Different Pressures 1 Tires=Single (S) 2 Tires=Dual (D)										
7.50R-16 XPS Rib	D (LRD)	PSI		35	40	45	50	55	60	65		
		Lbs	S	1620	1770	1930	2060	2190	2310	2440		
			D	2860	3130	3380	3630	3860	4080	4280		
225/70R 19.5 Pilot XZA	F (LRF)	PSI		55	60	65	70	75	80	85		
		Lbs	S	2475	2650	2835	3040	3220	3405	3640		
			D	4760	5120	5510	5840	6170	6500	6830		
225/70R 19.5 XRV	F (LRF)	PSI		55	60	65	70	75	80	85	90	95
		Lbs	S	2475	2615	2755	2895	3040	3195	3315	3450	3640
			D	4645	4910	5180	5440	5720	6000	6230	6490	6830
245/70R 19.5 XRV	F (LRF)	PSI		65	70	75	80	85	90	95		
		Lbs	S	3340	3440	3540	3640	3740	3890	4080		
			D	6230	6430	6630	6830	7030	7310	7720		
245/70R 19.5 XRV	G (LRG)	PSI		65	70	75	80	85	90	95	100	105	110
		Lbs	S	3340	3440	3540	3640	3740	3890	4080	4190	4335	4540
			D	6230	6430	6630	6830	7030	7310	7720	7880	8150	8600
235/80R 22.5 XRV	G (LRG)	PSI		75	80	85	90	95	100			
		Lbs	S	3595	3815	4035	4280	4545	4675			
			D	6790	7190	7630	8070	8555	8820			

Figure 13-8. Typical Inflation Pressures for Motor Home Tires

Whenever there is a significant change in the loading regimen of the motor home, it would be wise to recalculate the load weights of the tires to assure optimal use of the motor home.

Frequency of Checking Tire Inflation Pressures

When one has determined the "correct" tire inflation pressures for each of the motor-home tires (as a function of the "fully loaded" condition, of course) and inflated the tires under "cold" (i.e., tires haven't been driven for more than one mile) conditions; then the air pressures in the tires should be periodically checked to make sure that they retain their proper pressures. It is recommended that tire pressures be checked at least once a month (every two weeks would be better) and before any major trip. On long trips, the tires should be checked every "drive" morning. On short trips (a day or less), the tires should be checked before one departs on the trip and again before one returns home.

Check tire pressures when they are "cold"; that is, the tires haven't been driven at all or, at most, less than one mile before being measured. In this manner, the tire pressure has not been increased by the heating associated with both tire sidewall and tread flexure associated with traveling. If one must check tires that are warm or hot, remember that they will necessarily read higher than normal. Do not "bleed" these tires down to the "cold pressure" readings, as they will probably then be underinflated when they are actually cool. Don't make any adjustments to tire pressures when the tires are warm or hot, if such can be avoided.

To make these tire-pressure measurements, it is recommended that one purchase a quality, truck-tire air gauge which has an angled dual head. This type of gauge allows one to check inflation pressures of both the inner dual wheel which has the valve stem pointing towards one and on the outer wheel which has the valve stem pointing away from one. Pressure-sealing valve caps should always be used to protect the valve stems and prevent air from escaping from the valve stems.

Tire Wear, Balance, and Wheel Alignment

In addition to tire inflation considerations, the tires should also be periodically examined for other types of normal "wear and tear." If installed and maintained properly, all tires mounted on the motor home should wear in a smooth, even pattern. If the tires begin to show irregular wear patterns and the motor-home alignment is still correct, then sometimes just rotating the tires by changing wheel position and

rotation of the tires will allow the tires to wear evenly. Check with the chassis manufacturer (Freightliner) and its literature (in the Owner's Information Package) for particulars on maintaining proper wheel alignment. Tire rotation should include the spare tire in the rotation pattern and changing the direction of rotation of the tires. Tires can be rotated front-to-rear and side-to-side.

Tire Cleaning

Proper cleaning of the tires will assure maximum years of service. A soft brush and the normal mild soap should be used to clean the tires. Use care in applying any tire "dressing" product as these contain petroleum derivatives, alcohol, or silicones which may cause deterioration of the rubber, possibly leading to cracking, and accelerate the aging process. In many instances it isn't the actual dressing itself, but the reaction of that product with the antioxidant in the tire. Heat can compound this problem also.

INTERIOR CARE

Important

The fading of upholstery, carpet, and other interior fabrics is generally caused by excessive sunlight. The drapes, blinds, or other shades should be kept closed when the vehicle is parked for an extended period of time to minimize the fading. Normal deterioration of the appearance of such items caused by wear and/or exposure to strong lighting is not covered by the Tiffin Motorhomes Limited Warranty.

Carpet

A weekly routine of vacuuming the carpet and fabrics throughout the vehicle is recommended; the vacuum system (Figure 13-10) has a central connection (Figure 13-9) within the motor home wherein a vacuum hose can be connected and the necessary vacuuming performed, as desired. Doing such will prevent an undue accumulation of dirt which can detract from the appearance of the carpeting and, thus, shorten its expected life. Remember to empty or replace vacuum bags before they become overly full—this practice will assure that sufficient vacuuming capability is readily available to handle any and all cleaning situations that may arise. In carpet areas

Figure 13-10. Vacuum Cleaner System

Figure 13-9. Vacuum Hose Coupling

that receive the most sunlight, keeping the curtains closed whenever possible will minimize fading. Also act quickly when anything is spilled or dropped onto the carpet to prevent or minimize staining.

To connect the cleaning hose, raise the wall remote inlet valve door, (Figure 13-9) and align hose end coupling with slots on each side of intake opening. Firmly push into intake opening. Make sure hose end coupling is connected and is locked in place. To disconnect the hose, simply push in the slots on each side of the hose coupling and pull hose end straight out.

To start the vacuum cleaner:

1. Push the on/off switch on the main vacuum to the "on" position. Indicator light in switch will come on. Now the vacuum will come on and off by using the wall remote inlet valve.

2. To turn on, raise the door up.

3. To turn off, lower the inlet valve door down and the vacuum will turn off. The main vacuum on/off switch should stay in the "on" position all the time, except when traveling.

4. To turn completely off, return main vacuum on/off switch to the "off" position. The switch light will go off.

Warning

This appliance has a THERMAL PROTECTOR built in the motor to prevent overheating. If motor will not operate or shuts down while in operation wait 30 minutes; it will reset automatically. Turn unit off while it resets. If the motor does not come on, or Thermal Protector trips off again after a short period, service may be needed. A qualified service technician should perform service.

The vacuum cleaning system comes with an array of attachments that can be connected to the hose ends for extensive cleaning purposes. Make sure they are firmly pushed in and twist to hold in place.

For further instructions to change the dust bag, use the attachments, and proper cleaning technique, refer to the specific Owner's Manual located in your motor home.

Fabrics

The fabrics (Figure 13-11) used in this Tiffin motor home for the bedspread (Figure 13-12), draperies, headboard, and valances contain fire-retardant additives that may be damaged by use of

improper cleaning products. Cleaning instructions for these items are DRY CLEAN ONLY. **Water-based products are not recommended for cleaning the fabrics in your new vehicle**. Most water-based, household-cleaning products are not formulated for use on these fabrics and may cause excessive shrinkage or fading. For best results, the fabrics in this vehicle should be cleaned by a professional carpet/upholstery cleaner.

Figure 13-11. Furniture Fabrics

Spills, spots, or stains should be treated as soon as possible to avoid permanent damage to the fabrics. If a spill occurs, blot the fluid with a dry towel; do not rub the spill as rubbing may cause the liquid to "set" in the fabric and cause a stain. When attempting to clean a spot or stain, always start from the outside and work inward to avoid spreading the stain further. Some stains or soils are extremely difficult or impossible to be removed completely. These stains should receive immediate, professional attention. Spills, spots, stains, or soiled areas are the responsibility of the owner and are not covered by Tiffin Motorhomes Limited Warranty.

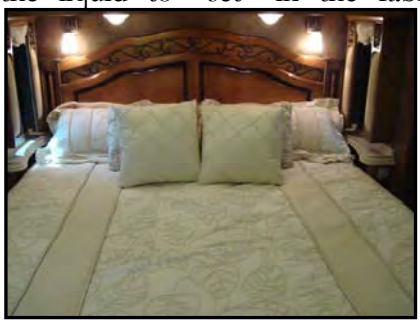

Figure 13-12. Bedroom Fabrics

Warning

When cleaning the upholstery and fabric of the motor home, do not use lacquer thinner, nail polish remover, laundry soaps, or bleach. Never use carbon tetrachloride or gasoline for cleaning purposes. These substances may cause damage to the materials being cleaned and most are highly flammable.

Walls and Ceiling

The wall and ceiling coverings should be cleaned periodically to maintain a new appearance. Use a non-abrasive cleaner with a soft cloth on the walls. Do not use solvents of any kind, as those solvents may damage the surfaces being so cleaned.

Dashboard

To keep the dashboard (Figure 13-13) in like-new condition, follow these guidelines:

DO:

- Dust and clean the dashboard with a soft, damp cloth or chamois, wiping the surface gently.
- Use a mild detergent and lukewarm water.
- Dry the surface, after washing and rinsing, by blotting with a damp cloth or chamois.

Figure 13-13. Typical Dashboard

DO NOT:

- Use harsh chemicals that may damage the dashboard.
- Use any cloth containing grit or abrasive particles or kitchen-scouring compounds to clean or dust the dashboard.
- Subject the dashboard to hard, direct blows.
- Use boiling water, strong solvents, or other such materials to clean the dashboard, as they will soften the plastic.

Woodwork & Floors

The wood cabinetry (Figure 13-14) should be cared for with furniture polish to sustain the natural beauty and luster of the wood. This procedure will also keep the cabinetry looking new, prevent the wood from drying, and reduce chances of accidental staining or aging.

Figure 13-14. Kitchen Cabinetry

Use area rugs and floor mats by the entrance door to trap dirt. Use soap and water to clean the (ceramic) flooring, begin by vacuuming the floor to remove loose dust and dirt. Then, damp mop the floor with a cleaning solution consisting of any standard cleaning solution available through retail-sales outlets (e.g., Wal-Mart, Kmart, Target) or grocery stores. The mop should be damp, but not dripping. Feel free to use soap-based cleaners, scouring powders, steel wool, abrasive cleaners, wax, or polish on the ceramic floor as this floor is impervious to these cleaning agents.

To remove stubborn spots like shoe polish, oil, tar, markers, scuffs, and the like; use a household solvent or nail-polish remover on those spots; then wipe those treated areas with a damp cloth.

To remove chocolate, grease, juice, or wine; use warm water and any off-the-shelf abrasive cleaner (cleansers and the like). To remove candle wax or chewing gum, carefully scrape off when the material has hardened. For further tips, please see the manufacturer's recommended information sheet in your Tiffin Motorhomes Owners Information Package.

Countertops

To care properly for the countertops (Figure 13-15) in your new motor home, always use a heat pad or trivet to protect the surface from hot objects that may mar or damage the countertop surface. Hot pans and heat-producing appliances (such as electric skillets), when set directly on top of the countertop, can possibly mar the beauty and finish of the product.

Figure 13-15. Kitchen Countertops

Additionally, since heat-producing appliances can also damage countertop seams, it is essential to check with Tiffin Motorhomes to identify seam locations to avoid them during subsequent use of the motor home. Although solid surfacing is repaired easily, certain steps should be taken to protect it.

Be sure to use a cutting board, rather than cutting directly on the countertop surfaces. Although minor scratches and cuts can be repaired, a little care will assure that the countertop surfaces will continue looking new for years.

Avoid using harsh chemicals on the countertop. Wipe the countertop with a damp cloth to remove water spots. For most dirt and stains, wipe with a damp cloth and use soapy water or glass cleaners (e.g., Windex).

If a stain doesn't respond to soap and water, for a matte finish, apply an abrasive cleanser and buff it with a Scotch-Brite pad, using a circular motion. Use the same technique in the case of a cigarette burn. If the finish is a gloss finish, please contact the dealer for specific cleaning instructions.

Do not expose the surface to harsh chemicals, such as paint remover, turpentine, nail polish remover, or any stove and drain cleansers. If these chemicals should come into contact with the countertop surfaces, immediately wash off these chemicals, using appropriate safety measures to avoid injury.

In the event of subsequent staining or spotting, sand the affected surface lightly with fine sandpaper (400 grit or finer), then buff in a circular motion with a Scotch-Brite pad.

Accessories

The light fixtures, bath accessories, and faucets can be cleaned by wiping with a soft, damp cloth. Washing with warm water will remove dry water spots. Do not use cleaners that contain harsh or abrasive chemicals. Alcohol or other similar solvents should never be used.

Detectors

The CO/LP gas detector is self-contained and DOES NOT require any maintenance other than normal cleaning and periodic testing. The smoke detector installed in the motor home is a nine-volt, battery-operated detector. The CO/LP gas detector uses three AA batteries for its operation.

The batteries in the smoke and CO/LP gas detectors need to be tested periodically and replaced when necessary (usually semiannually). When cleaning the case on any of the detectors, use a damp cloth or paper towel. Do not spray cleaners or wax directly into the case as this action may cause false alarms or hinder the normal operation of the detectors.

An inexpensive battery tester, available from any local electronics retailer, would be a good investment to make. This tester would allow checking of the batteries in the various alarms, any flashlights used in the motor home, and batteries in other appliances (e.g., portable radios, MP3 players, CD players, PDAs, and various electronic games) which may be in the motor home during travels.

Condensation

Important

Since surface condensation within the motor home cannot be controlled by the manufacturer, damage caused by condensation is not covered by the Tiffin Motorhomes Limited Warranty.

Damage may occur to your motor home if excessive condensation exists. Accumulation of condensation on surfaces within your motor home occurs when warm, moist air contacts a cool surface. It is most evident on the inside of windows, but this problem can be controlled by:

1. Slightly opening a window or roof vent to allow the moisture to escape from the motor home.

2. Using a small dehumidifier which is also effective in removing moisture from the air.

Condensation levels are highest during times when a person is cooking or taking a shower in the motor home, but these occasions are not the only times condensation is present. Walls and ceiling panels may become wet when the moisture accumulates on these surfaces. Tiffin Motorhomes does not recommend the use of any catalytic heaters because of resulting extensive condensation.

ROUTINE MAINTENANCE SCHEDULES

Important

Always follow the chassis maintenance guidelines found in the chassis manufacturer's owner's manual.

All routine maintenance is the responsibility of the owner and is not covered by the Tiffin Motorhomes Limited Warranty. Use the maintenance record found in Chapter 14 to record all performed maintenance as required.

Please note that any damage caused by improper or unperformed maintenance is not covered by the Tiffin Motorhomes Limited Warranty. Items supplied by other manufacturers may require specific individual maintenance not listed herein. Please refer to the manufacturers' suggested maintenance guidelines in the Owners Information Package.

Important

Cosmetic adjustments and alignments must be performed within the first three months from date of original purchase for warranty consideration. Thereafter, these items are considered routine maintenance.

Monthly

- Check the water levels of the batteries.
- Visually inspect the fire extinguisher(s).

Every Three Months

- Check LP gas lines for leaks with soap solution or leak detector.
- Clean the microwave hood exhaust fan filter and blades.
- Test smoke alarm, carbon monoxide detector, and CO/LP gas detector.
- Check operation of windows, latches, and hinges.
- Clean the roof; clean the roof ducted air conditioner filter or filters.
- Clean and inspect door and window seals; reseal where necessary.
- Inspect and reseal around the tub and shower area where necessary.
- Lubricate the exterior door hinges and latches with a graphite (silicone) lubricant.
- Check, clean, and tighten battery cables and inspect batteries for proper fluid levels.

Every Six Months

- Inspect any slide-out for proper seal. If realignment is necessary, please contact an authorized Tiffin Motorhomes Service Center.
- Inspect all exterior rubber seals and apply an UV inhibitor, such as 303 Protectant, as necessary.
- Change the battery in the smoke detector.
- Rotate tires as recommended by the tire manufacturer.
- Check all gas appliances for proper operation.
- Have the LP system inspected by a qualified technician.
- Lubricate the movable parts on the entrance step.
- Change the batteries in both the smoke detector and the CO/LP gas detector.

Annually

- Inspection of roof seams and joints should be performed by an authorized Motorhomes Service Center. If resealing is necessary, it is the owner's responsibility and is not covered by the Tiffin Motorhomes Limited Warranty.
- Sanitize the fresh water system.
- Wax and buff all gel-coat surfaces on the vehicle as described previously in this chapter.

Winterizing

To store your motor home for the winter months, it is necessary to winterize the water system (Figure 13-16) to help prevent freezing of this system. To do this, follow these instructions:

1. Drain all the water from the water system including the holding tank(s), the hot water heater, and the water tank; also drain the water filter, if installed. For the holding tank(s), open the gate valve(s) to drain the tanks. *Turn off water heater before draining to prevent burning element out. (NOTE: This procedure is to be performed **only** at a wastewater pumping station to prevent dumping of contaminated water elsewhere). For the hot water heater, remove the outside cover and then remove the drain plug. When this tank is drained, replace the drain plug and then replace the cover. For the water tank, open the green-handled valve to drain the tank; then close the green-handled valve. If an *optional* water filter is installed, remove the filter cartridge and store it in a clean environment (e.g., resealable plastic bag); empty any excess water from the filter housing and replace the housing.

Figure 13-16. Winterizing the Water System

2. Turn the by-pass valves at the water heater to the "by-pass" position to prevent filling the water heater tank with antifreeze.

3. Disconnect the inlet connection to the water pump [in the sanitation compartment under the motor home. Attach the supplied, vinyl hose (via the plastic coupling on the hose) to the inlet connection and hand-tighten that connection; do not over-tighten.

4. Place the other end of the hose into a gallon of freshwater system antifreeze (one can refer to the local Tiffin Motorhomes dealer or representative for the freshwater antifreeze formulation for your specific area). NOTE: Do not use automotive antifreeze; use only antifreeze approved for RV applications; otherwise, damage to the systems being protected may result.

5. Turn "on" the water pump to start the flow of antifreeze. Turn "on" each faucet, one at a time, and allow pure antifreeze to run through that piping. Let about one cup drop into the drains to protect the traps.

6. When all the antifreeze is withdrawn from the bottle, disconnect the clear vinyl hose from the water-pump inlet connection and reconnect the inlet line to the water pump. (This may require more than one gallon of antifreeze).

7. When the winterizing process is completed, turn the water pump "off" and then reconnect the water line. Store the vinyl hose for future use.

8. Open the water supply valve that controls flow from the pump to the tank to help prevent freezing on that water line.

Note: Remember, the motor home also has an exterior shower; therefore, this system must be winterized, as well.

If the motor home is equipped an optional ice maker and/or an optional washer/dryer, the following additional steps should be taken:

Washer/Dryer (*optional*)

1. With the washer/dryer power in the "off" position, put ½ quart of R.V.-type antifreeze in the drum; then close the door.

2. Turn the Program Selector knob to "spin." Then turn the power "on" and let the machine go through the spin cycle for one or two minutes.

3. Turn the power "off" and then unplug the washer/dryer or disconnect the power cord.

4. Shut off both water faucets and then disconnect the water-inlet hoses from the faucets and drain them. This completes the process.

Alternative Washer/Dryer Winterization through the Freshwater System

1. If one is currently pumping antifreeze through the freshwater system, follow these steps to winterize the washer/dryer:

2. With the washer/dryer power "off," turn the Wash Temperature knob to "Warm."

3. Turn the Program Selector knob to "Regular Wash" (located in the "Cotton Heavy Duty" section of the knob). Then turn the power "on."

4. When you see antifreeze in the drum, turn the power "off." Then advance the Program Selector knob to "Spin."

5. Turn the power "on" and allow the drum to spin for about 30 seconds.

6. Turn the power "off." This completes the process.

Depending on whether your particular motor home has a Dometic refrigerator with an *optional* ice maker or not, there are some steps to be taken in winterizing the *optional* ice maker associated with that refrigerator. For the *optional* ice maker, the proper steps to be taken are these:

Dometic Refrigerator Ice Maker (*Optional*)

1. Shut off the water supply to the ice maker.

2. Place a shallow pan under the water solenoid valve.

3. Remove the inlet fitting to the ice-maker water solenoid valve. Then drain the water from the supply line.

4. Remove the plastic nut and water line from the outlet side of the water solenoid valve. Then drain the water from that line. **Note**: Do not lose the metal insert from the plastic water line. One recommended way to secure this insert is to place it into a "zip lock" bag, seal the bag, punch a small hole through the top of the bag above the zip-lock, insert any type of "twist-tie" (i.e., paper-coated, flexible metal wire) fastener through the hole, and then secure that bag to the outlet line for safekeeping.

5. Connect a source of compressed air (up to 20 psig, maximum) onto the inlet fitting of the water solenoid valve. Apply AC power to the solenoid valve for forcing the ice maker mold assembly through several harvest cycles.

6. Remove the plastic cover from the mold assembly. The bail arm must be in the "down" (or "on") position.

7. Start the harvest cycle with a flat-blade screwdriver inserted into the center of the small gear.

8. Turn the gear counterclockwise (CCW), when the hold switch closes, the mold assembly will continue to operate through the harvest cycle. During the water-fill sequence of the harvest cycle, the compressed air will blow out the water trapped in the solenoid valve.

9. Repeat the harvest cycle operation (i.e., steps 7 and 8) several times. Note: Damage to the solenoid valve can occur if the AC power is applied for more than 20 seconds.

10. Reconnect and tighten the lines on the water solenoid valve. The metal insert must be installed in the plastic water line going to the outlet side of the water solenoid. Leave the water supply turned "off" until temperatures are above 0º F (-18º C).

11. Dry out the ice-maker mold assembly with a soft cloth. Place the bail arm in the "up" ("off") position.

Residential Refrigerator

The proper steps must be taken to ensure that the residential refrigerator is correctly winterized. Note that before winterizing the Amana refrigerator, **the water filters must be removed**. Please see the owner's manual for the Amana residential refrigerator that will be included in the Owner's Information Package.

Stacked Washer/Dryer *(Optional)*

For instructions on properly winterizing the stacked washer/dryer, please refer to the specific owner's manual located in the Owner's Information Package.

Hydro-Hot Heating System *(Optional)*

For instructions on properly winterizing the Hydro-Hot heating system, please refer to the specific owner's manual located in the Owner's Information Package.

Tankless Gas Water Heater *(Optional)*

For instructions on properly winterizing the tankless water heater, please refer to the specific owner's manual located in the Owner's Information Package.

1. Turn off the power supply and gas supply to the tankless gas water heater.
2. Turn off main water supply.
3. Open all hot water taps. (Bathroom, kitchen, laundry, etc.)
4. Drain water from plumbing lines.
5. Open pressure relief valve to drain remaining water from the heat exchanger.

De-Winterizing

1. To de-winterize your motor home, open both of the low-point drains to allow the antifreeze solution to drain from the water system.
2. Next, close the low-point drains and connect your motor home to the city water system. Put water in the freshwater tank and pump at least one gallon through the water pump to remove the antifreeze from the water pump. Leave bypass valve in bypass mode.
3. As in winterizing, open the kitchen faucet, bath faucet, inside and outside showers, turning "on" both the hot- and the cold-water valves and flushing the toilet until the antifreeze solution is flushed out of the system and the water flow is clear.

4. Once the system has been flushed, open the water heater bypass valve. Open the freshwater tank supply valve from the pump and the icemaker valve.

5. Reinstall the *optional* water filter. Fill water heater and hot water lines before turning water heater breaker on.

6. Be sure to close the fresh water tank drain valves to allow the tank to fill.

Washer/Dryer *(Optional)*

1. Flush the water pipes.

2. Reconnect the water inlet hoses to the corresponding hot and cold faucets; then turn "on" both water faucets.

3. Plug in the washer/dryer and /or reconnect the power.

4. Run the washer through the "Express" cycle with ½ tablespoon of powder detergent (or liquid equivalent) to clean out the antifreeze. This completes the process.

Chapter

14

Maintenance & Data Charts

RV Owner's Data Sheet

Please enter the following information in the table for your future use:

Allegro Bus: Year: _____ Model #: _____ Tiffin Serial #: _____

Appliance	Brand	Model Number	Serial Number
Refrigerator			
Washer / Dryer (*optional*)			
Water Heater			
Microwave			
Inverter/Converter			
Television, Front			
Back-Up Monitor, Rear			
AM/FM/CD Stereo			
DVD Entertainment Center			
Air Conditioner			
Generator			
Hydro-Hot Heating System (*optional)*			
Tankless Water Heater *(optional)*			

Reproduction Master – Copy this sheet and use copy to maintain your maintenance records. You may wish to keep the completed sheets in a three-ring binder for your permanent record.

RV Owner's Maintenance Record

Please enter the following information in the table for your future use:

Allegro Bus: Year: _____ Model #: _____ Tiffin Serial #: _____

Date / Mileage	Service Work Performed	Performed by	Cost ($)

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